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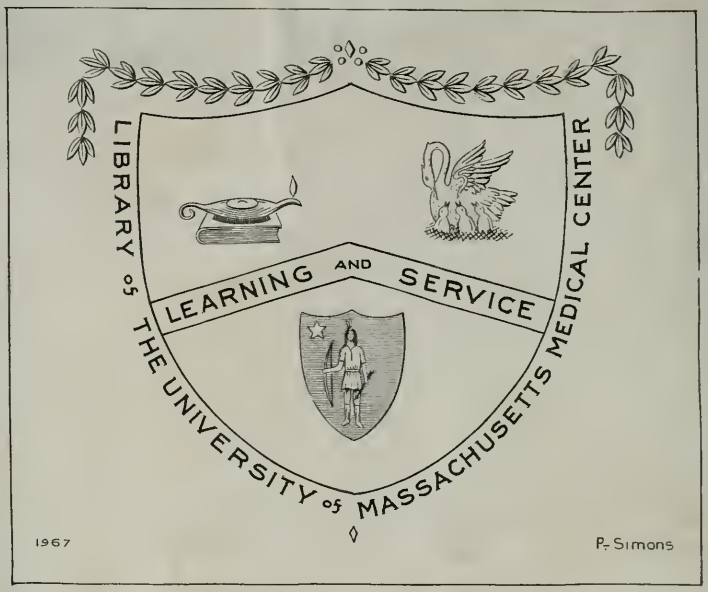
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A

TREATISE ON AMAUROSIS

AND

AMAUROTIC AFFECTIONS.

BY EDWARD OCTAVIUS HOCKEN.

"But thou
Revisit'st not these eyes, that roll in vain
To find thy piercing ray, and find no dawn;
So thick a drop serene hath quench'd their orbs,
Or dim suffusion veil'd."—MILTON.

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PREFACE.

In studying the diseases of the eye, my attention was especially called to those cases of imperfection, or loss of vision, usually designated Amaurosis, or amaurotic, but I found no separate treatise which embraced the consideration of all the varieties, causes, symptoms, and pathology of those affections, and a full, practical, and unexceptionable classification.

A work, in which the opinions of the best authors and most eminent men were collected and arranged, appeared to me a desideratum. Having for my own private use made some copious notes, with such intentions, I have ventured to publish this Treatise, the result, I trust, of correct observation and careful study, in which I have given those views which practical experience has led me to form, and have either confirmed them by the opinions of others, or quoted the contrary statements of authors upon the subject, classifying on full, but simple, and, I think, correct views.

I have selected the cases as being best adapted to illustrate that form of amaurosis under consideration.

In giving the opinions of others, I have thought it best to use the words of the author quoted, as a general rule, when permitted by the sense, and extent; my object being to collect such authorities as should render the volume as complete as possible, and to own my obligation to the authors quoted; nothing being easier than to give the opinion, without acknowledging the source. With these views, I submit this Treatise to the indulgence of a discerning profession.

15, *Featherstone Buildings,*
January, 1840.

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INTRODUCTION.

Diseases of the eye deservedly rank among the most important and interesting parts of pathology, and were it not so, their frequency, and the miserable results of disorganisation, would imperatively demand the medical man's strictest attention, both to their symptoms and treatment. As regards its interest, Mr. Cooper remarks that "were it not a subject disfigured by too many harsh and barbarous terms, I should say that it is one of the most inviting departments of surgical pathology and practice; one in which we may often actually see the changes of disease exactly as they occur, and estimate their nature with wonderful precision."[1]

But amaurosis, although rarely producing the disfigurement and apparent changes of organisation caused by the different species of ophthalmias, certainly is as important in its effects, and as melancholy in its results; for few privations bear comparison with loss of sight, and few diseases are so intractable in their progress, or certain in their results.

The study of amaurotic affections is by no means devoid of interest, as certainly it is not of importance, although it may present greater difficulties in its investigation than most of the other diseases of the eye, owing to the deep-seated nature of the parts affected, and the greater obscurity of all disturbances of the nervous functions. I cannot forbear from quoting Mr. Wardrop's opinion on this subject. He remarks that "the morbid alterations in the structure of the nervous system have hitherto been less successfully investigated than those of any of the other textures which compose the human body. These researches are also attended with peculiar difficulties, more especially in the retina; not only because the parts are extremely minute, and cannot be seen, like many of the other diseases in the living eye, but as very small deviations from the natural structure, which materially derange its functions,

[1] Cooper's First Lines of Surgery, p. 383, ed. 6th.

might escape even an attentive observer. Important, therefore, as the diseases of the nerve of vision undoubtedly are, much remains to be done by future observers in this part of pathology: and it is only by the collection of accurate histories and dissections that we can expect to be able to refer the various combination of symptoms which are observed in affections of this nerve to their respective morbid changes."[1]

The term amaurosis evidently includes a genus of morbid affections, not one invariable pathological condition induced by different exciting causes: thus, inflammation and want of nervous energy of the retina, will both produce imperfection or loss of vision; the one characterised by vascular derangement, tending to disorganising results, the other by loss of tone simply. In like manner various disorders and diseases of the optic nerve and brain frequently occasion amaurosis as a prominent symptom of their existence, and, indeed, sometimes as the most marked and distressing proof of their advance, to terminate, perhaps, in the slow but certain destruction of the ill-fated patient. The visual nervous structures are, moreover, sometimes simultaneously affected, the result of some local causes, or more frequently from general or constitutional disorder, where the general vascular system is either above or below par, and the nervous system permanently excited, or suffering from derangement, debility, and irritation; thus we have a class of amaurotic cases from debility, irritation, hyperæmia, and anæmia.

In the diagnosis of the various forms of amaurotic derangements which daily practical experience brings before us, how necessary is it to examine into their previous history and origin, their progress and early symptoms; to acquaint ourselves with their exciting causes, real or apparent, and the previous and present health, the constitutional peculiarities, derangements, and idiosyncrasies of the affected individual. As regards the present symptoms, we must take into consideration the form, size, and feel of the globe, its general healthy or diseased appearance, as well as the other objective appearances of the parts affected, which the practitioner can ascertain by the senses of sight and touch; as also a strict investigation into those defects of sensation, morbid appearances, and the various pains or uneasinesses of which the patient complains. Such are the means of forming a correct diagnosis, to detect the true pathological cause, and thus to employ those remedies which such a condition would indicate, without delay or loss of time; as the chance of success depends, in no slight degree, on the promptitude with which the symptoms are appropriately and actively combated.

Mr. Liston, in the preface to his "Elements of Surgery," most justly observes that "to treat surgical diseases as they ought to be treated, the practitioner must be thoroughly acquainted with the

[1] Wardrop's Morbid Anatomy of the Human Eye, vol. ii. 147, 8, 2d. ed.

healthy and morbid structure; he must also have a mind vigorous and firm from nature, well instructed in the best precedents, and matured by observation.

"Years are not the measure of experience. It does not follow that the older the surgeon is, the more experienced and trustworthy he must be. The greatest number of well-assorted facts on a particular subject constitutes experience, whether these facts have been culled in five years, or in fifty.

"It is only from experience, directed and aided by previous study, that accuracy of diagnosis and celerity of decision can be acquired."[1]

Guided and influenced by such considerations as I have mentioned, I have thought it best, in treating this complex subject, to commence with some few remarks on the anatomy and physiology of the visual nervous system, chiefly those points connected more especially with amaurosis; going on then to consider those varied affections of the retina, optic nerve, and brain, capable of producing amaurosis; next viewing their combined derangements; then amaurosis, from affections of the nervous trigeminus; and, lastly, some amaurotic and nervous disorders, as distinct affections, although occasionally existing as symptoms in amaurosis only.

[1] Liston's Elements of Surgery, Preface, 10, 11.

CHAPTER I.

The Anatomy and Physiology of the Visual Nervous System.

Sect. I.—*Anatomy.*

It will, I think, be readily granted, that the first step in the study of disease generally, is to comprehend thoroughly the anatomy and physiology of the affected organs, in order the better to understand their pathology. I shall, therefore, commence with a few observations on the anatomy and physiology of those parts connected with the study of amaurosis or amaurotic affections, namely, the nervous structures.

The *optic thalami* are two small oval bodies, consisting chiefly of medullary matter, situated behind and between the corpora striata, lying side by side. Their upper surfaces project into, and form a part of the floor of the ventricles; their lower constitutes the roof of its descending cornua, whilst the external is continuous with the corpus striatum and the structure of hemispheres. The internal surfaces of the thalami are in apposition, and are partially united by soft gray substance, (commissura mollis,) an interval existing both anteriorly and posteriorly.

Corpora geniculata. At the inferior surface of the cerebrum, on the posterior borders of the thalami, are situated two small slightly raised protuberances, named corpora geniculata. They furnish several filaments to the optic nerve, and are connected to the tubercula quadrigemina by medullary striæ.

The *Tænia semi-circularis* consists of a thin delicate line of semi-transparent nervous matter, of a white or light yellow colour, which separates the convex surface of the optic thalamus and the corpus striatum; commencing by the anterior pillar of the fornix, it passes between the corpora striata and optic thalami to the posterior border of that body, and apparently terminates in its descending cornu.

Pineal gland and peduncles. Behind and beneath the fornix we find a small body of a grayish colour and a conical shape, about the size of a pea, named the pineal gland. It is placed above the tubercula quadrigemina on which its base rests. In the adult human subject it frequently contains some small calculous bodies, which are very hard, and very much resemble coarse grains of sand; it consisted, when first formed, of two masses, which subsequently unite into one. The pineal gland is connected at its fore part to the optic thalami by two medullary cords, its peduncles, being otherwise perfectly isolated from the cerebral structure.

Optic nerves. Par secundum. The second pair or optic nerves arise from the corpora geniculata, and from the posterior part of

the thalamus nervi optici and nates by a fasciculus of white fibres (tractus opticus). The optic are the largest cerebral nerves; they give off no branches, and gradually approaching each other, they unite just before the corpora albicantia and the infundibulum, and between the anterior clinoid processes by a commissure. "The second nerve is properly that part of the cord which extends from the commissure to the globe of the eye."[1]

Very different opinions have been entertained since the days of Galen in regard to the arrangement of the nervous fibres at the optic commissure. Mr. Mayo observes, "there is much that is curious in the structure of the commissure: it may be better understood by reference to the figure at the end of this section (p. 262) than by any description in words. It appears that the outermost fibres of the tractus go to form the outermost fibres of the optic nerve of the same side: that the innermost fibrils of the tractus of one side are continuous with the innermost fibrils of the opposite; and that in a similar manner a sort of loop is formed by the innermost fibres of either optic nerve." There are many physiologists who are of opinion that a perfect decussation takes place; while some of the earlier anatomists described the fibres as merely to rest on one another, without any actual admixture of their substance. The greater number of physiologists, however, of the present day, incline to the opinion of Mr. Mayo, that a partial decussation or crossing of the fibres only, exists, the rest passing on uninterruptedly.[2] The optic nerves finally separate, and being covered with their neurilema they enter the optic foramina of the sphenoid bone, and pass on, surrounded by the recti muscles, to the globe of the eye. The ophthalmic artery "passes forwards from the internal carotid artery, where it lies by the anterior clinoid process, and enters the orbit by the foramen opticum, placed inferior and external to the optic nerve. It soon changes its direction, passing above and to the inside of the nerve, to reach the inner wall of the orbit, along which it runs, and finally terminates by branches that ramify on the side of the nose."[3] The optic nerves then perforate the sclerotic and choroid tunics, becoming at the same time considerably diminished in diameter, at the posterior and inner part of the eye; they then expand and are known by the name of the retinæ.[4]

The *retina* is the concave membranous expansion of the optic nerve, which receives impressions from external objects through the medium of light, and conveys it through the optic nerve to the

[1] Mayo's Elements of Human Physiology, p. 250, ed. 4th.

[2] In "the chiasma of mammalia and man, there is a partial decussation of the fibres of the two nerves, while another portion is continued to the retina of the same side."—*Müller.*

[3] Quain's Anatomy, p. 518.

[4] The optic nerves consist of primitive fibres similar to the brain, but smaller than those of other nerves, in man; but in some animals, as the sword-fish, they have the form of a membrane folded together like a curtain, and the retina formed simply by their being unfolded.—*Müller.*

sensorium, where the impression produces perception. The structure of the retina is exceedingly fine and delicate, and diaphanous; it receives its supply of blood from the ramus centralis retinæ, a small branch of the ophthalmic. The *ramus centralis retinæ* perforates the optic nerve, and running through its centre, arrives at the retina, where it divides into two branches, one of which, after being minutely divided, is distributed to the retina, the other passes on through the vitreous humour, supplying the hyaloid membrane, and terminates on the capsule of the crystalline lens.

The retina is placed between the choroid and the vitreous humour, with which it is merely in apposition. It extends from the bottom of the eye, where it is continuous with the optic nerve, as far forwards, apparently, as the commencement of the ciliary processes, where it ends by a defined margin, and is surrounded by loops of art. cent. retinæ, although some affirm that it extends as far as the circumference of the crystalline body. "In the plate," observes Mr. T. W. Jones, "the retina is represented as if terminating anteriorly by a serrated margin, but if carefully dissected, and the appearances minutely examined, the retina, although much reduced in thickness, really appears to be continued farther forward, adhering to or forming the zonula ciliaris."[1]

At the point where the optic nerve enters the eye-ball, its diameter is contracted; and, as I have before remarked, it does not enter in the centre, but a little to the inner or nasal side of the globe. When the eye is examined after death, we discover a round and projecting prominence of the nerve (papilla conica); which, according to Dr. Jacob, does not exist during life, but is produced after death by the contraction of the neurilema pressing out the medullary matter in this form.[2] The nervous structure then expands, being covered, or inclosed between two membranes.

The first of these is the vascular membrane; "it is a delicate transparent membrane, of such strength, that when detached it may be moved about in water, and freely examined without breaking. It adheres so firmly to the hyaloid membrane of the vitreous humour in the fresh eye, that it cannot be separated entire, and the medullary fibres adhere so closely to its external surface, that they cannot be detached at all in form of a distinct membrane."[3] Mr. Lawrence observes, "we can brush away the medullary part of the retina in the form of thin flocculi floating in water: there will remain a vascular basis, of a thin and cobweb-like texture, made of vascular ramifications, divided, subdivided, and united together, so as to form a most delicate membrane."[4] Dr. Jacob tells us that "to demonstrate the vascular layer, the sclerotic should be carefully removed, leaving a portion of the optic nerve freed from

[1] Mackenzie's Practical Treatise on Diseases of the Eye, Introduction, p. 28.
[2] Cyc. of Anatomy and Physiology, vol. ii. p. 185, art. Eye.
[3] Loc. cit. p. 186.
[4] Lawrence's Treatise on Diseases of the Eye, p. 24.

its sheath; the choroid should then also be removed under water, by tearing it asunder with a pair of forceps in each hand. The vitreous humour, covered by the retina only, should then be allowed to remain about two days in the water, at the end of which time the medullary layer softens and separates into flakes, which may be scraped from the vascular layer beneath by passing the edge of a knife gently over it, after which the vascular layer may be detached by careful management, and suspended in a bottle from the optic nerve."[1]

The membrana Jacobi, or second membrane of the retina, is a layer of extreme tenuity, which separates the medullary structure of the retina from the inner surface of the choroid, or rather from the membrane of the pigment. It is apparently of the same structure as the serous membranes; it is considered to be a double serous membrane by Mr. Dalrymple. He observes, "from observations made on the human eye, in connection with other experiments on the eyes of animals, I am induced to consider it as *a double reflected serous membrane.* I was first led to take up this opinion in the year 1827, by the accidental observation of a very delicate membrane, which lined and was adherent to the entire choroid. Having minutely injected the eye of a sheep, I made a vertical transverse section through the sclerotic, choroid, and retina, which last membrane, with Jacob's tunic, properly so called, and the vitreous body, I removed. I then placed the remaining portion of the eye in dilute spirits of wine, intending to preserve it for the examination of the tapetum, which in this instance was remarkably beautiful. A few minutes after its immersion, the tapetum lost to a considerable extent its brilliant hue, and I removed it from the glass to wash from its surface some deposit, which I thought might have obscured its polish. In doing this, however, I detached a delicate membrane, minutely filled with injection, and this membrane it was, which, on being placed in the spirit, became slightly opaque, and produced the effect alluded to; for the *tapetum* thus denuded instantly recovered, and still retains its brilliancy."[2] Dr. Jacob, the distinguished discoverer of the membrane itself, differs in opinion from Mr. Dalrymple, as regards the doubling of the membrane, for many reasons. "I should," he observes, "be inclined to think that the layer which Mr. Dalrymple found adhering to choroid was the membrane itself, which had not come away with the retina and vitreous humour, as I have found sometimes to happen."

Dr. Jacob, in Philosophical Transactions for 1819, gives the following method of examining this membrane:—"Having procured a human eye, within forty-eight hours after death, a thread should be passed through the layers of the cornea, by which the eye may be secured under water, by attaching it to a piece of wax, previously fastened to the bottom of the vessel, the posterior half of the sclerotic having been first removed. With a pair of dissecting forceps in

[1] Dr. Jacob, loc. cit. p. 186. [2] Anatomy of the Eye.

each hand, the choroid coat should be gently torn open and turned down. If the exposed surface be now carefully examined, an experienced eye may perceive that this is not the appearance usually presented by the retina; instead of the blue-white reticulated surface of that membrane, a uniform villous structure, more or less tinged by the black pigment, presents itself. If the extremity of the ivory handle of a dissecting-knife be pushed against this surface, a breach is made in it, and a membrane of great delicacy may be separated and turned down in folds over the choroid coat, presenting the most beautiful specimen of a delicate tissue which the human body affords. If a small opening be made in the membrane, and the blunt end of a probe introduced beneath, it may be separated throughout, without being turned down, remaining loose over the retina; in which state, if a small particle of paper or globule of air be introduced under it, it is raised so as to be seen against the light, and is thus displayed to great advantage; or it is sometimes so strong as to support small globules of quicksilver dropped between it and the retina, which renders its membranous nature still more evident. If a few drops of acid be added to the water after the membrane has been separated, it becomes opaque and much firmer, and may thus be preserved for several days, even without being immersed in spirit."

In the centre of the retina there is a transparent point, which Dr. Sömmerring, its discoverer, supposing it to be a foramen, named *foramen retinæ centrale;* it is now known, however, that the transparency results from a deficiency of medullary fibres (?) at that spot, not from the existence of a foramen in the retina. A yellow margin surrounds this spot, which was likewise discovered by Sömmerring, who named it *limbus luteus foraminis centralis.* At this point the retina is raised into a peculiar fold, which extends about two lines from near the temporal side of the entrance of the optic nerve, in a transverse direction outwards, concealing the central spot.

Nervus motorius oculi, motores oculorum, par tertium.—The third, or motor nerve of the eye, arises the third in order from the cerebrum, when counted from before backwards. It issues from the cerebral substance, and becomes invested with its neurilema and sheath of arachnoid membrane at the inner border of the crus cerebri, about two lines in front of the pons varolii: its fibrillæ may be traced, if the pons varolii be removed, into the gray substance within the cerebral protuberance. The nerve passes forwards and somewhat outwards, and enters a canal in the dura mater close to the posterior clinoid process, where it loses its serous investment; which becomes continuous with that which lines the dura mater.

In proceeding forwards, the third pair of nerves lie along the external wall of the cavernous sinus, being placed superior and internal to the fourth, the ophthalmic branch of the fifth, and the sixth nerves; it descends as it approaches the sphenoidal fissure, and becomes inferior to the other nerves, and just as it is about to

penetrate into the orbit, it receives a few delicate filaments from the cavernous plexus of the sympathetic, and one from the ophthalmic branch of the fifth nerve; then after dividing into two branches, which separately pierce the dura mater, it enters the orbit by passing between the heads of the external rectus muscle. When the nerve has entered the orbit, the smaller superior branch crosses the optic nerve to supply the superior rectus muscle, while it is continued on, having perforated that muscle, and terminates by being distributed to the levator palpebræ. The larger branch continues its course to the outside, and beneath the optic nerve, and at nearly the same point, it divides into three branches, one of which passes obliquely on to be distributed to the internal rectus muscle, another descends to supply the inferior rectus or depressor oculi, whilst the third branch, or continuation of the motor nerve, passing forwards between the inferior and external recti muscles, terminates in the inferior oblique. A small filament is given off from that branch which supplies the inferior oblique muscle; it enters the lenticular ganglion at its inferior and posterior angle, and forms its principal root.

The lenticular ganglion is placed at the posterior and outer part of the orbit, between the external rectus and the nervus opticus; it is formed on the long inferior branch of the third, or that branch which supplies the inferior oblique. The ganglion receives a branch from the nasal branch of the fifth, as it is passing over and above the optic nerve in the posterior part of the orbit, and it is likewise intimately connected with the superior cervical ganglion by a branch from the carotid plexus which accompanies the long portion, or branch to the inferior oblique muscle.

Numerous delicate filaments proceed from the ophthalmic ganglion; these run in a tortuous manner, sometimes forming loops with the ciliary nerves, sometimes uniting, and then shortly afterwards again dividing, and finally they pierce the sclerotica around the optic nerve, and form a hook-like process at the moment of penetration.

Fourth nerve, *nervus trochlearis*, *nervus patheticus*, *par quartum*.—This nerve is the smallest cerebral nerve, being not much larger than a sewing thread: it arises by two or three filaments, or sometimes by an undivided root from the *valvala Vieussenii*, and the lower part of the tubercula quadrigemina. Each nerve passes along by the side of the pons varolii, on a level with the margin of the tentorium cerebelli, and penetrates the dura mater behind the clinoid process; they then run for some way in a sheath formed by the dura mater, a little inferior and external to that of the third pair; it then passes above the cavernous sinus towards the sphenoidal fissure, through which it enters the orbit, passing at the same time above the third nerve. The nerve then passes forwards in the orbit, finally inclining upwards and inwards, and terminates in two or three branches, which are distributed to the superior oblique muscle, which enter it on its orbital surface. A small

branch, which is given off whilst the nerve lies on the external wall of the cavernous sinus, is reflected in the tentorium cerebelli, as far as the lateral sinus.

The fifth nerve, *nervus trigeminus, par quintum.*—This is the largest of the cerebral nerves; it emerges from the cerebral substance in two fasciculi or roots about the middle of the crus cerebelli, close to its junction with the pons varolii. The fibrillæ of both roots can be traced deeply. "Those of the sensitive or larger division can be followed downwards and backwards to the posterior columns of the medulla oblongata, whilst the other can be traced to the motor tract. It consists of from eighty to a hundred filaments, each invested by a neurilema. The filaments at the circumference receive their neurilema sooner than those of the centre; so that if the nerve be torn off, a sort of mamillary process remains, which seems as if it had been concealed in the interior of the nerve." [1]

The gasserian ganglion is formed on the largest of these two roots, underneath the dura mater, at the summit of the apex of the pars petrosa, where the nerve pierces the dura mater, and passes on in a canal formed for it in that membrane. Three branches are given off from the convex surface of this crescentic-shaped ganglion; one of which enters the orbit, and is distributed to the eyeball and iris, to the lachrymal gland, to the schneiderian membrane in the nose, and finally to the integuments and muscles of the forehead. The second branch proceeds beneath the orbit to the face, and is distributed to the alveoli of the superior maxilla, to the schneiderian membrane, and to the cheek, nostril, and palate. The third division of the fifth passes through the foramen ovale, and is distributed to the teeth of the inferior maxilla, to the tongue, to the muscles of the lower jaw, namely, to the masseter, the buccinator, the pterigoid, temporal, mylohyoideus, and circumflex palati muscles; it gives filaments, likewise, to the integuments of the chin and temple, and to the submaxillary and sublingual glands.

The smaller or ophthalmic branch of the nervus trigeminus divides into three branches; the frontal, the lachrymal, and the nasal or infra-trochlear. The frontal branch passes above the ext. rectus muscle, and runs between the levator palpebræ superioris and the periorbita, and then eventually terminates in three branches; one passes through the supra-orbitary foramen, and is distributed on the forehead; another passes outwards, and the third passes over the pulley surface for the superior oblique, (supra trochlear) and is distributed internally to the forehead.

The lachrymal nerve communicates by a small twig with the second branch of the fifth, or superior maxillary nerve, the main branch of the nerve passing onward to the lachrymal gland to which it is distributed, some branches penetrating it; another twig is distributed to the outer canthus.

[1] Quain's Anatomy, p. 760, edition 4th, illustrated.

The nasal branch passes between the two origins of the rectus externus, and then passes over the optic nerve, proceeding inwards and forwards under the recti muscles; it gives a twig to the lenticular ganglion, and two branches pass forwards on the optic nerve to pierce the sclerotica, (the short ciliary;) on reaching the nasal parietes of the orbit, a branch, which is distributed to the tip of the nose, passes through the foramen orbitale internum anterius, and passes through the cribriform lamella; whilst another twig passes from the nasal nerve underneath the trochlea of the superior oblique—thence called infra trochlear—and is distributed at the inner canthus of the eye.

The other or smaller root, which is a nerve of motion, passes below the ganglion and unites with the third division of the larger fasciculus, immediately after its exit from the skull; thus being perfectly analogous to the junction of the anterior and posterior roots of the spinal cord. Sömmerring observes, having described the larger division of the nerve, "minor nervi pars, majorem portionem descendendo obliquè præterit, neque ei fibros addit, eum ferè in modum, quo prior radix nervorum spinæ medullæ ganglion non intrat."[1]

Sixth nerve, *nervus abducens*, *par sextum*. The sixth nerve takes its origin from the superior extremity of the corpus pyramidale, where it joins with the pons varolii, near the central line. The nerve then passes forwards and upwards to enter the cavernous sinus, where it perforates the dura mater, and rests against the outside of the carotid artery, being placed between it and the ophthalmic nerve: while in the cavernous sinus, it receives a few filaments of communication from the carotid plexus; it then enters the orbit through the foramen lacerum, together with the third, fourth, and first branch of the fifth nerves, and running between the two heads of the external rectus, it terminates by two or three filaments which enter the ocular surface of that muscle.

Sect. II.—*Physiology.*

Consensual Movements of the Irides, Single Vision with the Two Eyes, the Influence of Light on the Motions of the Pupil, and the Effects of Injury of the Brain on Vision.

A remarkable connection and unity of action is displayed in the movements of the irides; the motion, however produced, being always simultaneous in the two eyes. Similar phenomena, but by no means so strongly developed as in the irides, are observed in all parts of the body. What is most worthy of attention is, that a stimulus acting only on one eye will produce contraction of both

[1] S. T. Sömmerring de Corp. Hum. Fabricâ, tom. iv. p. 214.

pupils; although the contraction will be less than when both eyes are open. By simply rotating the eye inwards and upwards we can produce dilation of the pupils. "But," observes Müller, "the most remarkable circumstance is, that the iris of both eyes contracts when one eye only is turned inwards, the other being still directed forwards."[1] The irides are not the only parts which display this tendency to consensual movement; almost all the muscles of the body, the eye especially, possess it in a greater or less degree: thus, it is impossible to turn the eyes in different directions at the same time; for instance, both outwards, or one downwards and the other upwards. "I can," says Müller, "move the muscles of the ear, even the smaller ear-muscles, the anti-tragicus at least, quite distinctly; but when I determine voluntarily these motions in one ear, they always take place on the other side also."

He observes, "the explanation of all these phenomena is evident. The primitive fibres of all the voluntary nerves being at their central extremity all spread out in the brain to receive the influence of the will, we may compare them, as they lie side by side in the organ of the mind, to the keys of a piano, on which our thoughts play or strike, and thus give rise to currents or vibrations of the nervous principle in a certain number of primitive nervous fibres, and consequently to motions. From the conducting power of the cerebral substance at the origin of the nervous fibres, however, those which are contiguous to each other must be liable to be affected simultaneously, and the influence of volition will with difficulty be confined to single fibres. By repeated exercise, this faculty of insulating the influence of the will is acquired; that is to say, the more frequently a certain number of nervous fibres are exposed to that influence, the more prone do they become to obey it independently of other surrounding fibres; or, in other words, certain paths for the more ready transmission of the cerebral influence are gradually developed. This faculty of the insulation of the influence of volition is seen to reach the highest degree of perfection in certain arts; for example, in the use of musical instruments, particularly of the piano."[2]

The most important application of the consensual movements just described is in the diagnosis of amaurosis: for in that disease the sensibility of the retina being lost, the pupil, in most cases, becomes dilated and immoveable from the influence of light. But it is necessary to recollect that if one of the eyes is sound, the iris of the blind eye moves, in some degree, in accordance with the motions of the sound pupil. But if the sound eye be closed, the pupil of the other will dilate: if the light be still further obstructed by placing the hand over the eye-lid of the closed eye, the pupil will dilate still farther.

Single Vision with the Two Eyes.—Other parts of the body

[1] Müller's Physiology, translated by Baly, p. 685.
[2] Müller, loc. cit. p. 686.

present, in a minor degree, similar "identification" of sensation as the optic nerves. Müller remarks, "no parallel case can be found in the whole body, and it must here depend on some special provision of structure. Impressions on the corresponding sensitive nerves of the right and left side in no other instance give rise to a single sensation. Similar impressions on the two hands are felt distinctly, not as one sensation; on the contrary, the two being conveyed to the sensorium, give rise in it to two distinct sensations."[1]

In order to trace the cause of single vision with the two eyes, we must recollect that in health the eyes are always directed in the same axis; any deviation from which, as may readily be ascertained by experiment, produces double vision. We always direct the axis of the eyes towards objects, because a certain point in the centre of either retina furnishes the most distinct vision, and it is on this account that the child soon learns to direct his eyes with "a simultaneous and corresponding effort." There are corresponding parts of the retinæ, the sensations of which are identical, but if an impression be made on parts not corresponding, vision becomes double. It is easy to prove that such is the fact, for by squinting voluntarily, or by depressing one of the eyes by pressure with the finger on the lid, objects appear double and seem to shift their places, as the position of the eye is varied, because the optic axis is varied in the depressed eye, and the image is no longer formed on corresponding points of the retinæ. "We may therefore consider it," observes Mr. Bell, "as a general fact, namely, that pictures of objects falling upon corresponding points of the two retinas, present the same appearance to the mind as if they had both fallen upon the same point of one retina; and pictures upon points of the two retinas which do not correspond, and which proceed from one object, present to the mind the same apparent distance and position as two objects, as if one of those pictures was carried to the point corresponding with it in the other retina."[2] Mr. Wardrop seems to entertain a different opinion on this point. He observes, "it has been demonstrated by writers on optics, that when an object is situated at the concourse of the optic axes of the two eyes, it is seen by both eyes in one and the same direction, and hence single vision is obtained: but if, from disease, the axis of one eye be so distorted that it cannot be directed to an object at the same time with the axis of the other eye, there is then produced a double image of that object. Thus has arisen the opinion of there being corresponding points in the two retinæ. The phenomena of disease of the eye, however, refute this doctrine, and afford striking illustrations of the power of habit in teaching us to see single with two eyes. It is by no means unusual for a person to acquire a squint suddenly, which is at first accompanied with double vision, and to

[1] Müller, by Baly, pp. 702, 703.
[2] Bell's Anat. and Physiology, 7th edit. p. 127.

find by degrees objects appear single. A person had one of his eyes distorted by a blow, and for some time every object appeared to him double; but by degrees those most familiar became single, and in time all objects appeared so, though the distortion continued. In like manner, it sometimes happens, that the pupil of one eye is deformed, and its position altered, so that the person sees double; but after a while vision, even under these circumstances, becomes single." [1]

We may ask how two impressions produce but a single perception? Mr. Lawrence asks, "is there not just an equal difficulty in single hearing with two ears? single thinking with a double brain? and the tangible perception of a single object with impressions on thousands of cutaneous nerves?" He observes again, "further, we find that in the attentive exercise of vision, when we look at objects, one eye only is employed, although both may be open, and apparently directed towards the object thus examined. A familiar experiment proves this: placing any object (a pencil) between himself and a candle, let a person bring the pencil and flame into a line, with both eyes open; then let him close one eye; if it is the weak eye, the flame and pencil are still seen in a line as before; if it is the strong eye, the flame of the candle seems to move aside, and is now seen out of the line with the pencil. In a considerable majority of instances, the right is the strong eye, or the one used for attentive vision." [2] Mr. Mayo's explanation of the subject is this: he says that both objects are seen, but in single vision they are seen in the same place, and therefore necessarily appear to form but one: the images coincide, and are therefore essentially indistinguishable. [3]

The influence of light on the motions of the pupil.—When the

[1] Wardrop's Morbid Anatomy of the Human Eye, 2d edit. pp. 231, 232, vol. ii. Treviranus, Steinbuch, and others, have stated that the identity of the fields of vision is acquired.

[2] Lawrence's Treatise on the Eye, p. 45.

[3] "Parts of the retina which lie in the same segments of the sphere, in the same meridian and the same parallel of latitude, the middle point of the retina being regarded as the pole,—or which lie at equal distances in the same direction from the centre of the retina,—are completely identical. All other parts of the retinæ are non-identical; and, when they are excited to action, the effect is the same as if the impressions were made on different parts of the same retina."—*Müller* by Baly, p. 1194.

"The cause of the impressions on identical points of the two retinæ giving rise to but one sensation, and the perception of a single image, must lie in the organization of the deeper or cerebral portion of the visual apparatus; it must at all events depend on some structural provision; for it is the property of the corresponding nerves of the two sides of the body in no other case to refer their sensations as one to one spot. It is exceedingly improbable that the identical action of the corresponding parts of the two retinæ is the result of a certain habituation, or of the influence of the mind. The co-operation of the two retinæ in one field of vision, whatever is its cause, must rather be the source of all the ideas to which single or double vision may give rise."—(Loc. cit. p. 1196.)

optic nerves of a living animal are divided within the cranium, the pupils become fully dilated, and are no longer influenced by the admission of light. Mr. Mayo, to whom we are chiefly indebted for the elucidation of this subject, observes:—"The iris receives nerves from two sources; from the sentient part of the fifth, and from the third: the main part of the latter is distributed as a voluntary nerve to the muscles of the eye. Now, if the head of a pigeon is cut off, and, instantly after, the upper part of the cranium is removed, and the entire brain be taken out, on pinching the portion of the third nerve which remains attached to the eye, I observed that the pupil is contracted suddenly, just as the biceps flexor cubiti acts in an animal recently killed, when the nerve which supplies that muscle is pinched. A similar injury to the fifth produces no visible effect.

"If the third nerve is divided in the cranial cavity while the animal is alive, the pupil immediately dilates to the utmost, and remains afterwards immoveable, the iris being seemingly paralyzed. When again the third nerve is pinched in the cranial cavity of a young cat instantly after death, the iris will occasionally act as in the pigeon. In either case the exposure of the nerve must be very promptly executed, or the effect described does not happen."[1]

Magendie has remarked that the iris becomes contracted, and the pupil immoveable, from the division of the optic nerves in guinea pigs and rabbits, within the cranial cavity. In most animals, on the contrary, as I have before remarked, dilation occurs under similar circumstances. "A young rabbit," says Mr. Mayo, "being killed, the upper part of the cranium was immediately removed, together with the cerebrum. The optic nerve thus exposed was pricked, and then divided; no movement of the iris ensued: the third nerve was pricked, and then divided; the iris exhibited no change: the fifth nerve was then slightly compressed, when the pupil became contracted, not suddenly, but slowly and gradually, and then slowly dilated again: upon now dividing the fifth, the pupil became contracted to the utmost, but in a gradual manner, although more promptly than when compressed only, and remained in this state. It is difficult to explain this singular phenomenon. But it should be mentioned, in connection with it, that in the cat and pigeon, in which the iris is paralyzed by the division of the third nerve, and the pupil remains permanently dilated afterwards, the pupil dilates likewise in death. In the rabbit, on the contrary, the pupil contracts as soon as life is entirely extinguished."[2]

What influence does the retina possess over the motions of the pupil? By shading the eye with the hand in a well lighted apartment, and then quickly removing it, dilation results in the first instance; contraction in the second. Now, it is evident that the

[1] Mayo's Physiology, p. 287.
[2] Loc. cit. p. 288.

contraction produced on the admission of light, was produced by its influence on the retina; for if we direct a strong light on the iris, "taking care that it shall not enter the pupil, no contraction of the aperture takes place. The iris does not move; the pupil is not altered, unless the retina be influenced."

Mr. Mayo supposes the pupil to be originally capable of voluntary motion; for he observes, "it remains uncertain what properties the human iris is endowed with. It is probable that its inner unattached edge is capable of voluntary contraction; but being accustomed to employ it on two occasions alone, (when the light thrown on objects or their distance varies,) we lose part of our original control over it. Such appears to be the condition of the muscles of the soft palate, which most persons are capable of moving in one or two combined actions only; but they are not the less under the influence of the will; and some persons are found, according to M. Magendie, who can move them separately at pleasure."[1]

That the motions of the iris do not entirely depend on the sympathetic influence of the retina, the experiments of Mr. Mayo, the spontaneous action of the pupils in some animals, as well as the dilation which results from the motion inwards and upwards, abundantly prove. In amaurosis, likewise, the motions of the iris are by no means always paralyzed; indeed they frequently retain a degree of motion, nay, in some cases, they move freely and briskly, a condition which M. Andral has shown to depend frequently on disease of the cerebellum. With Mr. Lawrence I think then that we must acknowledge that "these facts throw considerable doubt upon the received notions respecting the physiology of the motions of the iris, and on the usual explanation of that familiar phenomenon, the changes in the dimension of the pupil."

The pupil is contracted during sleep; a fact which may be ascertained by gently raising the eyelid of a sleeping child. On awaking, the pupil, after a few oscillatory movements, assumes the natural state of dilation. By Mr. Hawkins' experiments, we ascertain that by admitting intense light to the sleeping eye, the pupil is still further contracted. "If," says Mr. Lawrence, "a perfect state of motion can subsist in the iris when the retina is completely insensible, the changes of the pupil cannot be referred to the effect of light on the optic nerve. To what then, it may be asked, are we to refer them? How are they to be explained? I confess that I cannot explain them." Mr. Bell asserts that wounds of the iris, for instance, occurring in the operation of couching, or extraction, or irritation from contact with the operating instrument, have no effect in producing contraction of the iris.

The effects of injury of the brain on vision.—Organic diseases of the brain exercise a very powerful influence on the functions of some other parts with which it, apparently, has no connection.

[1] Mayo's Physiology, p. 288.

We find, for instance, that diseases of those parts of the brain, which, from experiment, appear to have no direct connection with the organ of vision, not unfrequently produce amaurosis; thus, according to Flourens, if one of the lobi optici be removed, or one-half of the corpora quadragemina in mammiferous animals, we produce blindness of that eye which is on the opposite side of the injury; the mobility of the iris being retained for a considerable time. "It is a remarkable fact," says Müller, "that while injury to one of the optic lobes always destroys the sight of the opposite eye, yet the contractility of the iris under the influence of light is not lost if the mutilation be only superficial; a complete removal of the optic lobes paralyzing the iris as well as the sense of sight. Flourens explains this on the supposition that a partial removal of the optic lobes does not abolish the excitability of the optic nerves, because it does not destroy all their roots. The motion of the iris is certainly dependent on the excitation of the optic nerves by light; for Flourens found that irritation of these nerves causes the iris to contract, and division of them paralyzed its motions. The explanation given by Flourens is correct; but, when the optic lobe is partially removed on one side only, the action of light on the retina which is not paralyzed will explain the contraction of the iris of the blinded eye."[1]

The constant effect of deep wounds of the hemispheres, is a state of stupidity and blindness of the eye of the opposite side.

CHAPTER II.

Definition, General Observations.—Symptoms, Causes, Diagnosis.—Prognosis, Pathological Anatomy.—Treatment.

Amaurosis, from its frequency, and from the importance of all affections of the nervous system of the visual apparatus, demands a careful study of the varieties of the morbid affections themselves, as also, a careful discrimination, as regards its diagnosis, from other diseases of the eye.

Amaurosis is derived from the Greek αμαυρόω to obscure.

Def.—Amaurosis is that imperfection or loss of vision, which results either from the diminution, or the entire loss of nervous sensibility, whether functional or organic, sympathetic or symptomatic.

Various other terms have been used to designate these affections, as gutta serena, which implies a more complete state of blindness; cataracta nigra, from the natural black colour of the pupil being

[1] Müller, by Baly, p. 830, 831.

retained; suffusion, dysopia, &c. Amblyopia is used in general to convey the idea of imperfection of vision (imperfect amaurosis.)

The terms gutta serena, and suffusion, are used in the sublime verse of Milton, in his Address to Light.

> . . . . . "Thee I revisit safe,
> And feel thy sovereign vital lamp; but thou
> Revisit'st not these eyes, that roll in vain
> To find thy piercing ray, and find no dawn;
> So thick a drop serene hath quench'd their orbs,
> Or dim suffusion veil'd."[1]

Amaurosis occurs at all ages, but is more common in the aged. It affects eyes of all colours, but occurs most frequently in persons with black irides. Amaurosis is sometimes congenital, frequently hereditary, and rarely confines its ravages to one eye. It has been remarked that it occurs more frequently in females than males.

Mr. Tyrrell has observed "that amaurosis from disease in the choroid coat occurs most frequently in persons with light-coloured irides, of feeble power, especially in those of scrofulous diathesis, and that it appears during the early period of life."[2]

Symptoms.—A peculiar appearance of blindness and want of expression is especially remarkable in amaurotic patients.

This vacancy of expression, which results from the inability of the patient to direct his eyes in the locality of objects that he wishes to view, gives an appearance of squinting or cast in the eye, which Richter supposes to be the only infallible symptom, when we have reason to doubt the veracity of the patient. The condition of the pupil varies exceedingly, according to the stage and variety of amaurosis. The iris is most commonly dilated and immoveable, sometimes so much so as scarcely to be visible; whilst in some cases of chronic retenitis, the pupil is so much contracted, as not to exceed the size of a small pin's head. The mobility, likewise, varies much; in most cases the pupils, (one eye being closed) will be found to move sluggishly, and imperfectly, or not at all. We must not forget, in examining an amaurotic patient, the consensual movements of the irides, as, if we neglected to cover the sound eye, supposing one eye only to be affected, the iris of the amaurotic eye, would move in accordance with the variations in the condition of the sound pupil. An active condition of the pupil occurs occasionally, however, in amaurosis. In some cases, its natural sensibility is increased. M. Andral has shown, that where the iris retains its natural mobility and activity, whilst the function of the retina is nearly or completely impeded, it not unfrequently depends on disease of the cerebellum.

Strabismus occurs very frequently when the amaurosis is confined to one eye; and it is always, or nearly always, inwards or towards the nose. Oscillatory movements of the eyes, which have been supposed to result from the eager search after light, occurs

[1] Paradise Lost, Book III. line 21.
[2] Tyrrell, Art. Amaurosis, Cyc. of Practical Surgery, p. 106.

now and then in amaurosis; it is not uncommon in congenital cases, where some faint glimmerings of light remain, it is then, usually, complicated with cataract.

When increased vascularity of the retina and internal tunics gives rise to amaurosis, a similar condition of the vessels of the sclerotica and conjunctiva usually accompanies it. When this condition is inflammatory, the vessels are arranged around the cornea, in a complete zone. "In zonular inflammation," observes Dr. Mackenzie, "the vessels are small and hair-like, never very tortuous, but running like separate radii towards the cornea, thus forming not a network, but a halo, over which the conjunctiva is easily made to slide."[1]

The iris is frequently discoloured, the pupil irregular, and displaced from its natural position, "upwards, downwards, inwards, or outwards, but most frequently in a diagonal direction between upwards and inwards."[2]

The colour of the pupil is changed in some cases; there is a deep-seated buff or greenish-coloured opacity, seen only by looking straight through the pupil, in a good light. In elderly subjects there is generally more or less of a glaucomatous change of the humours and pigment, the eye is either sunken and soft, or unusually firm and prominent. We sometimes meet with cases, where the pupil is retracted towards the retina, whilst the other parts of the iris bulge forward towards the cornea, "so as to form," observes Mr. Middlemore, "if I may be permitted the comparison, a very small and exceedingly shallow funnel, its point being directed towards the optic nerve."[3]

Amaurosis occasionally occurs suddenly, but its advance is usually slow and progressive.

The condition of the eye itself deserves notice; being sometimes enlarged and prominent, and unusually firm and resisting to the feel; at other times the eye is sunken, small, and unnaturally soft and yielding; sometimes it is flattened on one or more of its sides; at other times the sclerotica is discoloured, frequently thinned, and allowing the blue colour of the choroid coat to appear through it, or it is itself covered with varicose vessels.

In all cases it is necessary to ascertain the peculiarities of the case if possible, its exciting causes, the duration, and the rapidity with which the symptoms increase, the age, idiosyncrasies, and constitution of the patient, his habits and employments. "We find," says Dr. Mackenzie, "all sorts of people amongst the amaurotic; from him whose vessels seem on the point of bursting with plethora, and who has long revelled in the solid luxuries of the table, down to the emaciated victim of famine and habitual intoxication; all ages, all ranks, and professions; and not unfrequently

[1] Mackenzie's Practical Treatise on Diseases of the Eye, edit. 2, p. 396.
[2] Wardrop's Morbid Anatomy of the Eye, edit. 2, p. 200.
[3] Middlemore's Treatise on Diseases of the Eye, vol. ii. p. 261.

it happens, that by directing our attention to the history of the individual's previous mode of life, his pursuits, and his habits, we are enabled to detect the circumstances which have been the exciting causes of his complaint, and by the careful avoidance of which, for the future, the cure may be greatly promoted."[1]

We should examine the region of the forehead to ascertain that the branches of the fifth nerve were not implicated in any cicatrix, and also the teeth, in order to detect, and remove, any irritation of the branches of the trigeminus which supply them, since instances are on record of amaurosis depending solely on such causes, and which have ceased immediately on the removal of the exciting cause.

Paralytic affections of the levator palpebræ superioris, and of the other muscles of the face, may accompany the progress of amaurosis. "These phenomena," observes Dr. Copeland, "are chiefly remarked in cases where the motor oculi, or the facial nerve, is injured."[2]

Mr. Middlemore advises us to investigate the mobility of the pupil under the influence of belladonna, "as far as it is capable of being placed under its influence;" and in various degrees of light. "We should," he observes, "regard as a favourable symptom the continuance of the perfect mobility of the pupil, but by no means pronounce a case to be hopeless in which its mobility was lost."[3]

"*Subjective*" *symptoms.*—Amaurotic patients complain of "weakness of vision," in some cases a correct name enough, but rarely so. If the symptoms depend on atony of the nerve (weakness of vision), objects appear, at first, clear and distinct, but become confused, distorted, and at length invisible by exercise of the organs. The imperfection of vision, commonly termed "weakness," differs, however, exceedingly from the symptoms just described. Objects appear confused, distorted, and as if seen through a mist. A candle appears surrounded by a halo, the flame is distorted and imperfectly defined, and the patient usually sees best in a strong light; for instance, he courts the mid-day sunshine, while he sees little or nothing in the imperfect light of twilight or the darkness of evening.

The progress, duration, and extent of these symptoms vary exceedingly; the patients may become completely and permanently blind in a night, or they may continue for months or years, with but very little progress. As regards the duration, they may continue for a few hours, or remain during life, and yet some degree of sight be retained to the last. "Hence," observes Mr. Mackenzie, "the distinctions of *sudden* and *slow*, *complete* and *incomplete* amaurosis."

Intolerance of light (photophobia) greatly annoys some amaurotic patients. It frequently depends on chronic retinitis; when, instead

[1] Practical Treatise, p. 908.
[2] Dr. Copland's Dictionary of Practical Medicine, vol. i. p. 53.
[3] Treatise on the Diseases of the Eye, vol. ii. p. 262.

of vision being improved by a bright light, as usually occurs in amaurosis—it, like cataract, becomes more obscure. This intolerance of light becomes greatly mitigated during twilight and night; but the vision continues very imperfect and defective. But sometimes, during the early stages of amaurosis, the sensibility of the retina is increased, at the same time that the power of vision is greatly diminished, quite independently of inflammation. "But," observes Mr. Middlemore, "some amaurotic patients are annoyed by the bright light of day; it would seem as though the sensibility of the retina were increased, although the power of vision is greatly diminished; but this is usually nothing more than an early symptom of only some few varieties of amaurosis; it does not continue so as to constitute one of its later symptoms.

"The condition of photophobia, is wholly unconnected with retinitis; and although it is relieved by protecting the eyes from bright light, the moderated measure of light does not restore to the organ perfect vision; the sight is, in fact, impaired in a greater or less degree, although, from the degree of intolerance of light which it presents, it might be inferred that the sensibility of the retina was increased in a manner which was wholly inconsistent with the existence of impaired and cloudy vision."[1].

Pain in the eyes and over the orbit, which is generally of a periodical character, and is invariably aggravated at night, accompanies many of the varieties of amaurosis. Cephalalgia is a still more frequent symptom, and is usually accompanied by vertigo, or disinclination for any exertion, bodily or mental, tinnitus aurium, sleepiness; or, on the contrary, disturbance of the digestive organs, and restless nights.

Double vision (diplopia) is very frequently troublesome during the early stages of the disease, and is often one of the first symptoms. Occasionally only half of an object is visible (hemiopia), the rest being enveloped in mist, or perfectly invisible. Sometimes the patient loses sight of only a word here and there (visus interruptus) whilst all the rest of the page appears comparatively clear. Frequently objects appear distorted (visus defiguratus), or they are seen of a colour different from their true or real colour (visus coloratus, chrupsia); again they sometimes appear as if seen through gauze, or a film pierced with numerous minute apertures, a state of vision which has been termed visus reticulatus. An amaurotic eye will occasionally discern objects only in an oblique direction, or all bodies appear magnified (visus magnificatus); sometimes they are multiplied (visus multiplicatus), while other patients catch sight of objects only in motion; but see scarcely any thing whilst at rest.

Spectral illusions are generally complained of; in some cases they are bright and luminous, like a shower of falling stars; at other times flashes of light, sparks, and scintillations, or metallic appearances, like globules of mercury, &c. Muscæ are still more

[1] Middlemore's Treatise, vol. ii. p. 257.

common, which sometimes are fixed; or there is a solitary musca (scotoma); occasionally they are numerous, and assume every variety of size, shape, and figure, and appear to move in all directions (muscæ volitantes).

Mr. Travers thus describes them. "The musca volitans is sometimes solitary, following the eye at a fixed angle, as it passes along a line; sometimes two, three, or more are presented; more frequently an immense assemblage, descending in a cloud as the eye is raised, and ascending as it is depressed. They are obvious to so many analogies, and apprehension of impending blindness makes patients so minute in their observation and description of them, that it is scarcely possible to do justice to our experience in attempting to describe them. Sometimes they are represented as globular; sometimes angular and flat, like a piece of money. Portions of flue, of soot, insects' wings, transparent vesicles, or minute globules of quicksilver, connected like the links of a chain, or short hairs, with their bulbs attached to them, are ordinary resemblances. They occupy the air with some persons,—and are seen, upon looking at the sky, or upon a white sheet of paper, and especially in shifting the eye from one object to another; to some they appear in the fire or candle only; and with others they seem to cover the ground, so that they walk in them knee-deep."

With the other symptoms just described, the patient frequently complains of myopia or presbyopia. Dr. Mackenzie has known a confirmed amaurotic patient to see large objects with considerable distinctness, through a double-concave glass of twelve inches' focus; and another who was totally blind in the right eye, and with the left fast hastening to the same state, who could still with the latter read an ordinary type, by the aid of a double convex glass of seven inches' focus.

An unusual dryness of the eyes and nostrils is sometimes observed in chronic retinitis, and other forms of amaurosis; and benefit is often obtained in these cases, from a restoration of the secretions of the lachrymal gland, conjunctiva, and schneiderian membrane (Mackenzie).

It is of great importance to ascertain the previous history of the disease, the condition of the health of the individual antecedent to, and at the time of the commencement of the amaurotic symptoms, and likewise the primary local symptoms; we should likewise inquire into his previous habits and ailments, his constitution and diathesis; and ascertain whether he be strumous, or has suffered from gout or rheumatism; whether he has had syphilis, or undergone long courses of mercurial medicines for its cure; whether he has had fevers, especially typhoid fevers, or inflammatory attacks of the brain, or any other serious affection of that organ, as apoplexy, epilepsy, paralysis, or convulsions; or has received blows, falls, or other injuries on the head: we should, if a female, ascertain the condition of the uterine functions, whether she is subject to hysteria, or has ever suffered from puerperal convulsions. The

digestive organs require particular attention; and we should inquire into their present and usual condition; whether the patient has worms, or is hypochondriacal, &c.

Stages and Grades.—Amaurosis is *complete* or *incomplete*, *incipient* or *confirmed.*

In the *incipient* stage, the patient still retains some degree of vision, although more or less impaired. A great deal may, in this case, be done by active and persevering treatment, towards retarding the progress of the disease, and frequently of bringing about a perfect cure. When the blindness is complete from the first, it frequently happens that the case is incurable, under any treatment. In the confirmed stage, the affection usually ceases to progress, the sight being rarely entirely lost; the patient retaining often a faint perception of light and shadow, or even of some colours, or objects well illuminated, or strongly contrasted. In the *complete*, the patient is quite insensible to the presence of light; if the power of distinguishing any object or colour, or even light, be retained, the amaurosis is incomplete. Remedies are rarely of much service, even in the inveterate stage of amaurosis; much less so in the complete.

Causes.—The causes of amaurosis are various, and usually complicated, and "can rarely be attributed to the influence of any single remote cause." Hereditary predisposition is occasionally met with as a cause. Beer traced this tendency in several families; in one of them through three successive generations, especially in the female branches of the family, all of whom became blind at the period of the cessation of the catamenia, who had not borne children. Beer states likewise, that persons with dark-coloured irides, are much more liable to it than with light; the proportion being upwards of twenty to one. The males of the family just mentioned, as well as the females, had dark brown coloured irides; and although none of the male branches lost their sight, yet they all showed a decided tendency to the disease.

Any causes which produce or promote sanguineous congestion of the visual nervous apparatus, or inflammation, or serous effusion in the encephalon; for instance, insolation, rage, or excesses of any of the exciting passions, forced exertions of mind or body, occupations which require frequent stooping, errors of diet, and the neglected disorders of the stomach and liver, the abuse of wine or spirituous liquors, suppressed discharges, especially sanguineous ones, retrocession of eruptive diseases, and habitual constipation, may predispose to, or excite amaurosis.

Causes the very reverse of those now mentioned, such as induce anæmia of the nervous system, frequently produce amaurosis; as from excessive evacuations, especially loss of blood, chronic diarrhœa, manustupration, the depressing passions, but above all long-continued grief, typhoid fevers, the excessive use of tobacco, undue lactation, long continued and neglected leucorrhœa, or excessive venery, &c.

Amaurosis may be induced by over-exertion of the sight on minute and brilliantly illuminated objects, or by exposure of the eyes to great heat. The occupation or employment of the eyes on minute objects is especially injurious by candle or lamp light, and during the hours which ought to be devoted to sleep. A single exposure of the organs to these causes rarely extinguishes the sensibility of the retina; it is by the long-continued strain of the sight thus induced, frequently co-operating with dyspepsia, and habitual constipation brought on by sedentary habits, that the patient becomes amaurotic. Lightning will occasionally produce instantaneous blindness. The same exciting causes will produce, in some instances, a state of acute or chronic inflammation of the retina; or, on the contrary, a gradual but progressive failure of function—atony of the retina, weakness of vision.

Blows or injuries of the eye, injuries of the branches of the nervus trigeminus, or even in some cases only irritation, as from a carious tooth, &c., and blows or injuries of the head, have sometimes proved the remote causes of this disease.

The poisonous action of some substances produces, as one of their symptoms, an attack of amaurosis. Belladonna, stramonium, opium, hyoscyamus, solanum dulcamara, tobacco, poisonous fish, various fungi, &c. have this effect. Some of these substances operate in a more slow and gradual manner; for instance tobacco, which when used in excess, besides great debility, probably operates by its poisonous effects on the nervous system.

Acute and chronic gastric or intestinal dyspepsia, or uterine irritation, hepatic disease, &c. induce sudden and violent fits of amaurosis, or a more permanent lesion of the optic function, by the sympathetic disturbance of the retinal functions, which disturbance is produced probably through the medium of the brain, or a more permanent state of congestion of the visual nervous system.

Amaurosis is sometimes congenital: when it depends on some deficiency in the development of the retina, or of the optic nerve, or sensorium. Congenital cataract is frequently combined with congenital amaurosis. "Five or six years ago," observes Mr. Gibson, "I recollect to have seen five or six children, the families of two sisters, who were all totally blind, and in an idiotic state, with cataracts accompanied by amaurosis."[1]

Some authors have mentioned the gouty and rheumatic diathesis, misplaced and retrocedent gout and rheumatism, frequent attacks of strumous ophthalmia, the constitutional effects of syphilis, and the injurious influences of long and severe mercurial courses, as occasional exciting causes. "But that chronic affection," says Mr. Lawrence, "beginning in, and confined to, the nervous tunic of the eye, which we generally understand by the term amaurosis, has never been produced by syphilis, in the way that iritis is, within

[1] Edinburgh Med. and Surg. Journal, vol. vii. p. 398.

my observation. The optic nerve may suffer by contiguity in consequence of syphilitic disease in the bones of the head."

"Amaurosis may occur in the gouty and rheumatic; but the local affection receives no peculiar character from the constitutional disposition, nor does it require peculiar treatment."[1]

Proximate or *efficient causes.*—Under the name of amaurosis very dissimilar, and even opposite conditions of the nervous textures of vision, are included. Amaurosis then, or blindness more or less complete, resulting from deficient nervous sensibility, is a symptom of very different pathological conditions, affecting either the retina, optic nerve, or brain separately, or the whole of these parts conjointly. Affections of the nervus trigeminus may likewise produce amaurosis.

The pathological conditions of the retina and choroid, which produce amaurosis, are,

α. Acute and chronic inflammation of the retina and choroid tunics. The inflammation which originates in these parts, may by its violence and activity extend to the other textures of the eye, and produce complete disorganisation and collapse of the tunics, or exist for a length of time in a very chronic and insidious form, and at length induce organic changes, with complete or incomplete abolition of the visual function.

β. Organic changes, the result of hyperæmia of these parts. A varicose condition of the vessels of the retina or choroid may be the permanent result of continued dilation of either the arterial or venous system, and give rise to amaurosis; or various changes may be induced in the retina, as induration, thickening, opacity, or unnatural adhesions to other parts, &c.; the membrane of the pigment may be injured in divers ways, or the vision be impaired by changes in the quantity or quality of the pigmentum nigrum.

γ. Pressure operating on the retina. The retina may be compressed by dropsy of the vitreous humour, and by sub-choroid and sub-sclerotic dropsy, by tumours of the orbit elongating and protruding the globe, and from a depressed lens.

δ. Injury of the retina from blows, wounds, &c. The texture of the retina may be injured or its blood-vessels ruptured by these causes, even violent pressure on the eyes has been known to produce permanent amaurosis.

ε. Organic diseases commencing in, or implicating the retina. The retina may become changed considerably in its structure, as in fungus hæmatodes, and melanosis; its structure may be softened, ossified, atrophied, or even entirely absorbed, or a congenital deficiency or defect of development may have existed.

ζ. Atony of the retina. "The susceptibility of the retina may be at once and directly depressed, without going through the process of inflammation and sustaining its consequences, in the same way as the nervous power of other parts of the system may be

[1] Lawrence's Treatise, p. 520.

lowered or taken away by powerfully depressing and rapidly enervating agents."[1]

2. *Pathological conditions of the optic nerve connected with and producing amaurosis:—*

α. The optic nerve and its neurilema may be inflamed, and organic changes may result from the inflammation. Mr. Middlemore has seen the neurilema of the optic nerve hypertrophied to such a degree as to cause the absorption of a great part of the nervous matter it enveloped.

β. Malignant diseases may have their origin in the optic nerve or its neurilema, or implicate it in their progress, or cysts, hydatids, calcareous and bony tumours, &c., may form in it, or the nerve may be entirely absent, or possess an originally defective structure.

γ. Injury of the optic nerve.

δ. Pressure operating on the optic nerve. A variety of causes may produce amaurosis from pressure on the optic nerve; exostoses, hyperostosis, orbital encysted tumours, malignant diseases of the orbital cellular substance, hypertrophy or scirrhus of it, sarcomatous, steatomatous tumours, &c., of the orbit, operate by compression and elongation of the nerve.

3. *The pathological conditions of the parts within the cranium which are capable of producing amaurosis.*

α. Acute and chronic encephalitis, and their results.

β. Organic disease, namely, malignant diseases, tumours, organic changes, the results of inflammation, and in fact any disease of the brain, its membranes, or of the bones, compressing or irritating the brain, occasionally give rise to amaurosis.

γ. *Disordered circulation in the cranium and apoplexy.* A condition of hyperæmia or disordered circulation within the cranium from excess of arterial or venous blood, or an opposite state, viz., a deficient supply of arterial blood from anæmia, have an equal influence in disturbing the functions of the brain, and not unfrequently produce amaurosis.

δ. *Injury, concussion, fracture, with depression,* have been known to give rise to amaurosis as almost their only symptom.

ε. An original defect or arrest of development of some parts of the brain.

4. *Pathological condition of the visual nervous system, productive of amaurosis.*

α. Hyperæmia of these structures may be the result of general fulness of the body (plethora), or of the general causes of local congestion already enumerated, tight neckcloths, impeded return of the venous blood from the head, as from the pressure of tumours, disease of the heart, and lungs, are occasional causes.

β. *Anæmia.* The functions of these parts, as of every other, languish from an imperfect supply of vitalised or arterial blood, and it is by no means unusual for amaurotic symptoms to be developed

[1] Middlemore's Treatise, vol. ii. p. 247.

after profuse evacuations, or diseases which induce excessive debility.

γ. Certain poisons produce amaurosis, as belladonna, hyoscyamus, &c., probably by their influence on the brain and retina, and partly by the excessive dilation of the pupil which they occasion.

Amaurosis from affections of the nervus trigeminus.

α. Injuries and diseases of the nerve within the cranium produce amaurosis, destructive inflammation, and ulceration of the cornea, and lastly, evacuation of the contents of the globe, and collapse of the tunics.

β. Affections of the branches of the fifth nerve. Wounds of the forehead have been observed to be occasionally followed by blindness by different authors, as far back as the days of Hippocrates, who observes, "the sight is obscured in wounds which are inflicted on the eyebrow or a little higher." Blindness is sometimes produced by irritation, disease, or injuries of the other branches.

Diagnosis.—Amaurosis is liable to be mistaken, unless we pay a due degree of attention to the distinguishing symptoms, for incipient cataract, and for glaucoma. It is of the utmost importance that a clear diagnosis in practice should be made between these diseases, but especially between incipient cataract and amaurosis; for either in this case, in one instance, much valuable time will be lost, and our treatment injuriously inert, whilst the amaurosis is progressing, or on the other hand, if we mistake cataract for amaurosis, the patient will be unnecessarily punished by active treatment; although, wherever any doubt exists, it is preferable to err on this side, than confound amaurosis with cataract.

In cataract (incipient,) for "it is not possible," says Mr. Middlemore, "to confound a pure and mature case of cataract with one of simple and complete amaurosis," the vision is gradually impaired, objects are seen as if a mist, thin cloud, or gauze intervened, and which, as the lens becomes more opaque, gets thicker and thicker, until the form of objects is completely hid by it; whereas, in amaurosis, the dimness or loss of sight is often sudden, and objects appear distorted, imperfect, double, &c., or covered with motes, flies, or black spots. Muscæ volitantes occasionally precede and accompany the formation of cataract; whilst on the other hand indistinct and cloudy vision is complained of in incipient amaurosis, which proceeds gradually until vision becomes quite extinct, which (complete loss of sight) never occurs in simple cataract.

A cataractous patient sees objects best in an oblique direction, owing to the greater opacity of the centre of the lens, which renders bodies placed directly in front of him to be apparently enveloped in mist, cloud, &c.; but even this occasionally occurs in amaurosis. Dr. Mackenzie observes, "this circumstance might appear likely to afford ground for distinguishing incipient cataract from amaurosis, were it not well ascertained that also those who begin to be affected with diminished sensibility of the retina, are in

many instances able to see objects placed to one side, much better than the objects which stand directly before them; and that some, in whom amaurosis is even far advanced, continue to see only when they look inwards or outwards, while in every other direction they see very obscurely, or not at all."[1]

It is of the greatest importance, likewise, to ascertain the degree of light in which the patient sees best. In amaurosis it is usual for the patient to see best in a strong light, or when objects are brilliantly illuminated; so great, indeed, is the desire for strong light, as mid-day sunshine, &c., that it has been termed "a thirst for light." An exactly opposite condition obtains in cataract; for the strong light produces contraction of the pupil, the rays of light reflected from objects must therefore pass through the centre (the more opaque part) of the lens, and vision is consequently impeded; but the pupil dilates in a weak light, and the more transparent edges of the lens allowing a greater number of rays to penetrate to the retina, a greatly improved condition of the cataract patient's sight is the consequence.[2]

There are other symptoms which usually precede and accompany the progress of amaurosis; such as headache, pain in the eye and brow, vertigo, abdominal irritation, &c., which may complicate, but are quite unconnected with the usual formation of cataract.

Instead of the cloudy indistinct vision of cataract, to an amaurotic patient objects usually appear imperfect, distorted, or broken; the flame of a candle appears surrounded by a halo, or broken, distorted, or confused. "To him who has an incipient cataract, a candle or a street-lamp seems expanded into a large globe of weaker light; it looks, to use the phrase of a countryman at the Glasgow Eye Infirmary, as if "every lamp was as big as a corn-sieve." (Mackenzie.)

In cataract the motions of the pupil are as extensive and active as in health, whilst the pupil is generally dilated and immoveable, or sluggish and limited in its motions in amaurosis; there are, however, many exceptions to this proposition. "The mobility," says Dr. Copland, "of the iris is a principal source of diagnosis. For, in incipient cataract, the contractions of the pupil are as extensive and as vivid as in health; but, in incipient amaurosis, the pupil is either dilated and fixed, or its motions limited and slow.—Also, in the latter disease, the movements of the eye-balls and eyelids are often imperfect, or difficult; whereas no impediment of this description exists in cataract. In many cases of amaurosis, we observe a want of direction in the eyes, or a slight degree of stra-

[1] Practical Treatise, p. 673.

[2] I lately saw a remarkable exception to these statements, where the patient, with lenticular cataract, saw best in a strong light, but this was owing to firm adhesions of the pupil (the entire circumference) to the capsule.

bismus, not unfrequently with a want of power over the motions of the upper lid,—symptoms that never occur in cataract." [1]

The vacant expression of the countenance of an amaurotic patient, is never produced by the defect of vision arising from cataract. The cataract patient, when spoken to, directs his attention and eyes to the locality of the speaker, because his sight is never entirely lost. Dr. Jacob observes, "most writers have described the vacant expression of countenance which is often observed in persons completely blind from amaurosis. In such case the patient approaches with a moping stare and gesture of apprehension, as if completely bewildered. This is, however, often accompanied by other symptoms of paralysis, and is, perhaps, to be observed in those cases only which depend on cerebral disease. The gesture of the patient blind from cataract is different, because vision is not entirely gone; he approaches in an attitude as if endeavouring to see something through the thick cloud which is interposed between him and objects." [2]

The pupil in amaurosis is rarely of the clear black colour of health, there is a slight haziness of the humours, which could scarcely be distinguished from incipient cataract. When the pupil is dilated by the influence of belladonna in cataract, it greatly improves the vision of the patient. "So beneficial is this application," observes Mr. Delagarde, "that I have known persons, who considered themselves cured by it, whilst labouring under the earliest stage of this disease." [3]

Amaurosis may exist with cataract, commencing at the same time and advancing together; or a cataract may be formed in an eye previously amaurotic; or amaurosis may occur in a cataractous eye. In cataract combined with amaurosis, we must form our diagnosis from the union of the symptoms; such, for instance, as evident opacity situated close behind the pupil, and scintillations, dilated and immoveable pupil, cephalalgia, the vacant and unmeaning stare, &c. It is of the greatest consequence to ascertain the complication of cataract with amaurosis, inasmuch as the combination of diseases would preclude all idea of operative measures for relief of the former.

Diagnosis from glaucoma.—In glaucoma there is a deep-seated greenish appearance of the humours, and change of colour of the iris, the eye-ball is unnaturally tense and firm, the vision in both affections is greatly injured, and the pupil dilated, sluggish, or motionless. "Hence," observes Mr. Lawrence, "the distinction is difficult in some cases. It is more important in reference to prognosis than treatment; for the same means are applicable to both affections, though the chance of benefit is much less in glaucoma than in amaurosis." [4]

[1] Copland's Medical Dictionary, Art. Amaurosis, p. 57.
[2] Cyc. of Practical Medicine, Art. Amaurosis, p. 59, 60.
[3] Delagarde's Treatise on Cataract, p. 10.
[4] Treatise on Diseases of the Eye, p. 525.

When cataract occurs in combination with glaucoma, the diagnosis is easy, since simple, uncomplicated cataract, is never of a green colour.

Prognosis.—It is necessary, in order to form our prognosis, to ascertain the proximate cause, the duration of the disease, and the extent to which vision is impaired. A judicious and persevering trial of remedies, will go far in deciding its curability. Mr. Lawrence remarks, "when the antiphlogistic treatment, and a fair trial of mercury have failed, I fear that we shall not effect any further essential good by other means."[1]

The more recent the case, in general, and the less injury done to the sight, the more chance of success is there, and the more favourable may be our prognosis. When we are able to discover the cause, and the amaurosis is evidently produced by hyperæmia of the visual nervous structures, or by inflammation, or is simply functional, and occurs in patients under the middle period of life, complete restoration of vision is not uncommon. By far the great majority of amaurotic patients, however, receive but partial benefit.

The suddenness of the attack is usually an encouraging sign, unless there is complete insensibility of the nervous structure. When the eye-ball is of its natural firmness, the iris but moderately dilated, and of its proper colour, the pupil of its natural form, and no glaucomatous changes have occurred, "we may," says Dr. Mackenzie, "pronounce a more favourable prognosis than when the pupil is fixed in the state either of expansion or contraction, the eye-ball either boggy or of preternatural hardness, or the interior of the eye presenting a greenish opacity." (p. 912.) Amaurosis depending on debilitating causes, is with few exceptions readily curable, where it is possible to remove the enervating cause itself.

Our prognosis must be unfavourable where there is complete abolition of the retinal function, in all cases of long standing, congenital imperfections of vision, when depending on hydrocephalus, or from severe injuries of the eye, when organic changes have been produced by inflammation. "If," remarks Mr. Middlemore, "the amaurotic affection be complete, and originated in acute or chronic inflammation of the retina, which, however, has long subsided, the loss of vision will most probably depend on some structural change in the retina, and is not likely to be restored; although, as I before represented, such cases are not quite desperate, inasmuch as the opaque matter deposited by the inflammatory process within the texture of the retina, may become wholly or partially absorbed, leaving that tunic in the same or nearly in the same state as it was prior to the attack. Gutta serena depending on organic change in the retina, and on considerable atonic enlargement of its vessels, is, for the most part, absolutely irremediable."[2]

[1] Treatise, p. 529.
[2] Middlemore's Treatise, p. 274.

Should the attack be sudden, and nearly complete, and attended by hemiopia, visus duplicatus, visus defiguratus, or other amaurotic symptoms, with paralytic affections of the muscles of the eye-ball, eyelids, or face, we should be authorised in suspecting it to arise from general or partial pressure within the cranium, which, although indicating considerable danger, or even permanent loss of sight, may, nevertheless, be frequently removed by well-directed and energetic measures, when adopted early in the disease. The case is very unfavourable, when permanent and severe headache, epileptic, or slight apoplectic fits, a gradually progressive paralysis (creeping palsy) affections of the various senses, especially the slow supervention of one amaurotic symptom after another, are present, as they probably arise from organic disease within the cranium.

Amaurosis from affections of the nervus trigeminus, may frequently be remedied by the removal of irritating causes, by the perfect division of the frontal branch, when injured, &c. Where no evident organic changes of the eye-ball exist, and there are no symptoms of organic disease of the brain, we must not blindly suppose that every case is dependent on organic changes, and therefore incurable.

Pathological Anatomy.—The morbid changes discoverable after death, are either the causes or the consequences of the amaurosis.

Retina.—The retina has been found thickened, opaque, of a buff colour, (which Mr. Wardrop thinks may be probably produced by the effusion of coagulable lymph,) and adherent to the neighbouring parts. Magendie found the retina converted into a white fibrous membrane. "All the posterior chamber was lined by a membrane, which was white, fibrous, very firm, and in every respect resembling an aponeurosis. This membrane, which was evidently the retina, covered an osseous shell, to which it adhered throughout, by a firm cellular texture, forming nearly a complete envelope to the retina. Behind the bone was the choroid coat in every respect natural."[1]

Dr. Juengken of Berlin mentions, in his account of the Ophthalmic School of Vienna, that it contains a collection of anatomical and pathological preparations of the eye, which he imagines to be unique of its kind. Among them is a series of amaurotic and atropic eyes, in which the retina and ciliary body are ossified. The change commences in the retina from the foramen centrale: a bony ring is formed round it at first, in the centre of which the foramen remains open, and larger than in the natural state. In some of the eyes, this ring is the only thing to be seen; while in others, the ossification extends, and gradually ends towards the circumference; the ossified retina being collapsed, and in folds. In the most diseased eyes, the ciliary body is also ossified, the change

[1] Voyez Mem. Fibreux, Dic. de Sci. Med.

being most considerable in the middle of each organ, and less marked where they approach each other.[1]

The vessels of the retina and choroid have been observed in a varicose condition. Beer has noticed this in some cases of amaurosis. "This," observes Mr. Wardrop, "is a change which very probably takes place in those cases of amaurosis, where there are symptoms of congestion in the head, and where the disease is relieved by depletion. When the vitreous humour was evacuated from a lady's eye, affected with amaurosis, a profuse hemorrhage came on soon after the operation, which probably arose from a varicose state of the vessels of the retina, as well as those of the choroid coat. In this instance, the vitreous humour had degenerated into an aqueous fluid; and varicose vessels were observed on the sclerotic coat, towards its posterior part.

"It is not improbable that, in many cases of impaired vision, where figures of various forms appear before the eyes, these symptoms arise from a change in the vessels of the retina."[2]

An aneurism of the central artery of each retina, which produced amaurosis, was detected in a princess of Baden, who had been blind for a long time, and to whom Plenck, Richter, and the first surgeons of Germany had been called. She only saw a little on looking downwards. The aneurisms compressed the optic nerves. This pathological preparation is in the possession of Professor Schmidler of Friburg.

In persons who have been long amaurotic, the medullary fibres of the retina have been found entirely wanting.

Michaelis found the *macula lutea* converted into a black spot in an amaurotic eye.

The retina becomes atrophied, from long disuse of the organ. Andral observes "when the optic nerve becomes affected with atrophy, the retina must likewise share more or less in the affection; and it is an extraordinary circumstance, that an accidental osseous production is then often found interposed between it and the choroid."[3]

Optic nerve.—The optic nerves have been found discoloured and flattened, affected with various tumours—osseous, calculous, fibrous, encysted, steatomatous, puriform, aneurismal, &c.

A large hydatid, which produced amaurosis, was discovered in the optic nerve by Paw.

The optic nerves are sometimes atrophied, indurated, softened; the medullary substance absorbed and replaced by liquid matter; their vessels may be varicose, their fibres infiltrated with serum, or cysts formed in their neurilema.

In Mr. Heaviside's museum, there is a preparation exhibiting a tumour of considerable size, which had grown from the neurilema of the optic nerve of an amaurotic eye.

[1] Graefe and Walter's Journal, vol. i. p. 514.

[2] Wardrop's Morbid Anatomy of the Human Eye. Edit. 2, vol. ii. p. 166.

[3] Andral's Pathological Anatomy. Trans. by Drs. Townsend and West, vol. ii. p. 796.

Mr. Travers gives (Synopsis of the Diseases of the Eye, p. 151) an account of a lardaceous tumour, which compressed the optic ganglion and nerve at its origin from it; it was of the size of a garden bean, and situated on the same side as the blindness.

The changes in the structure of the optic nerve and its investments, which Beer had himself ascertained by dissections, consisted of real indurations of the proper structure of the optic nerves, and an adhesion of them to their sheaths; while within the skull these ash-coloured, gray, atrophied nerves, presented no trace of medullary matter, even as far as their origin from the brain. The optic thalamus, on the contrary, presented externally its natural appearance. The retina appeared to have lost its pulpy structure, was tough, not readily torn, and appeared simply to consist of a vascular membrane. "In one example, although both eyes had been completely deprived of sight together, Beer found only the retina and optic nerve of the left side in this state of atrophy, as far forwards as the point of union in the sella turcica. On the other hand, the optic nerve of the right eye was hard, without being in the least dwindled, and was closely adherent to its external coverings. Anteriorly to their decussation, nothing at all preternatural, in either nerve, could be discerned. But the left corpus striatum was so indurated, that a very sharp, strong scalpel was required for its division; though in colour and shape it was perfectly natural. On this side, also, the plexus choroides was entirely wanting. In three amaurotic patients of this kind, Beer found hydatids between the coverings of the optic nerve; and where such hydatids lay, the medullary matter seemed to have been displaced by their pressure. With the utmost care, he could not trace the ophthalmic ganglion."[1]

Morgagni discovered, on opening the head of a woman who had been blind, and who had complained of excruciating pain in her head, "a stone, the bulk of a pea, in the very substance of the optic nerve." The same author found a large scrofulous tumour at the origin of the optic nerves. Ferro found the optic nerves embedded in albumen, in an amaurotic patient, which he supposed to be the effect of gout.

In a man who had been amaurotic in the right eye, the optic nerve was found of a brownish colour, and thin for about one finger's breadth from the eye. It contained no medullary fibres, but a thick viscid fluid of a muddy gray colour. When the fluid was pressed out, the neurilema remained in the form of a tube, the sides of which were thicker than natural. Beyond this portion, the medullary matter was firmer but discoloured, and the nerve thinner as far as the union of the two nerves.[2]

The medullary matter of the optic nerve and retina undergoes considerable changes in fungus hæmatodes.

[1] Cooper's Surgical Dictionary, edit. 7, p. 33.
[2] Voigtel's Handbuch, Erster Band.

Morgagni has related a case of amaurosis, where "a remarkable bladder, full of the most limpid watery matter, occupied the optic nerve at the place of their crossing." (Epist. xiii. art. 6.)

"There is in the fiftieth volume of the *Journal Général de Medecine*, a case of suppuration of the optic nerve. The nerve appeared sound externally; but, internally it was filled with a puriform matter, of a dirty white colour, from the commissure to the globe of the eye. The subject of the case was a man aged forty, who died at the Hotel-Dieu, of an adynamic fever. For the six last months of his life he had lost the use of the left eye; the blindness had come on slowly. He had also been long subject to violent headaches. The eye appeared to be sound, and the iris was perfectly moveable."[1]

"In a man who had lost the sight of his left eye for two months before his death, there was found in the centre of the optic nerve a small hard tubercle of grayish colour, and somewhat larger than a grain of hemp." (Loc. cit. p. 102, Andral.)

"Atrophy of the nerves is seldom found," says M. Andral, "except in cases where the parts to which they were distributed had themselves undergone a diminution in the activity of their natural nutrition, or of their functions; and is principally observed in the optic nerve.

"In the greater number of cases where an eye has long lost the power of vision, we find remarkable changes in the structure of the optic nerve. In some of these cases, undoubtedly, the primary lesion was in the nerve itself; but these are the least numerous, the lesion of the nerve being generally consecutive. Thus, it is found in persons whose blindness was owing to a nebula or cataract, as also in cases where the eye had been destroyed by some external injury; and the longer the eye has lost its sight, the more considerable is the alteration of the optic nerve.

"Atrophy of the optic nerve presents the following characters. Its bulk is diminished, so that it is sometimes reduced to a third, a fourth, or a fifth of its natural size; and its medullary substance disappears, leaving in the interior of the nerve a gray semi-transparent substance. In many cases, according as the nervous substance thus disappears, the neurilema acquires greater thickness and consistence, which gives the nerve the appearance of a fibrous or almost cartilaginous cord: in other cases, nothing of the kind occurs, and, instead of the nerve, we merely find a membranous sheath, with thin, transparent parietes, and containing a semi-fluid cellular substance. As the bulk of the nerve diminishes, the foramen opticum also becomes contracted; just as the orbit itself tends to become effaced in cases of considerable atrophy of the globe of the eye. This affection is observed much more frequently in the portion of the nerve between the eye and the commissure, than behind that point; but, when it does continue behind it, it is always

[1] Andral's Path. Anat. Trans. vol. ii. p. 800.

in the nerve that goes to the thalamus opticus of the other side, thus demonstrating the fact of the intersection of the optic nerves. As to the thalami, they are very seldom altered, even when the optic nerves are in the greatest possible state of atrophy. On the other hand, it is a remarkable fact that blindness is seldom produced by any of the various and frequent alterations of the thalami.

"Atrophy of the optic nerve seldom takes place but very slowly after the loss of sight of one eye. I have in many instances found no appearance of it in persons who had been blind for several years; and Magendie found it scarcely observable in a girl who had been blind of an eye for seven years. In other cases on the contrary, the atrophy occurs in a short time. It appears, from some experiments of Sömmerring, and Magendie, that it takes place more rapidly in the mammalia, and still more so in birds; as if the rapidity of its occurrence were in proportion to the keenness of the sight previously possessed." (Trans. p. 793—6.)

The optic nerves are occasionally atrophied from the pressure of tumours, &c. "A remarkable case of this kind occurred lately at the Hotel-Dieu. An osseous cyst, as large as a nut, was found on the sella turcica, resting on the commissure of the optic nerves, of which latter there was not a vestige to be found except in the orbits. The individual in whom this was found, had been affected with total blindness, complicated with violent cephalalgia. However, he used to recover his sight in a small degree from time to time. Now, how are we to reconcile this with the account of the state of the optic nerves? It can only be done by supposing them to have been atrophied, but not completely destroyed; or else to have escaped observation by being expanded over the surface of the cyst, like the nerves around an aneurismal sac." (Andral, p. 797, 798.)

Pathological anatomy of the brain in amaurosis.—All the organic diseases of the brain and its membranes, or the compression and irritation arising from disease of the cranial bones, are capable of producing, under certain circumstances, the disease in question. The most common and remarkable of these are organic diseases of the pineal and pituitary glands, abscesses of the brain, serous and sanguineous effusions, medullary sarcoma, ramollissement, induration, tumours, and exostoses.

Examples of amaurosis arising from abscesses of the brain, are reported by Ballonius, Pellargus, Peyronie, Langenbeck, Travers, (Synopsis, p. 143.) Mr. Travers has seen fungus hæmatodes of the brain which produced amaurosis.

"I have seen," says Mr. S. Cooper, "a case of amaurosis, in which a medullary tumour, as large as a middling-sized apple, was found in the anterior lobe of the brain, attended with protrusion of the eye, and vast destruction of the bone." (Surg. Dict. p. 33.)

Bonetus gives the case of an abscess of the mammillary process, which was attended with amaurosis, and proved fatal. The same author found "a steatomatous tumour, the bulk of a fist between the cerebrum and the cerebellum, producing amaurosis."

Beer mentions the case of a lady, who had been completely amaurotic, and for some weeks before her death insensible, in whose skull the quantity of minute sharp exostoses was so great, that scarcely any part of its cavity could be touched without risk of the fingers being hurt by the spiculæ. In one instance Beer found, in a boy who had been blind, and who for a short time before his death was so insane as to devour his own excrement, a long considerable spicula at the side of the sella turcica, which transfixed the optic nerves at the place of their decussation.

"The results of pathological anatomy," observes Müller, "can, however, never have more than a limited application to the physiology of the brain. We are unacquainted with the laws, according to which the different parts of the organ participate in the affections of each other; and we can only, in a general way, regard as certain, that organic diseases in one part of the brain may induce changes in the functions of other parts; but from these parts, and the results of pathological anatomy, we cannot always draw certain conclusions. Degenerations, in the most various parts of the brain, which appear, from experiment, to have no immediate connection with the central organs of the sense of vision, nevertheless frequently cause blindness; and at this we must be the less surprised, since, even in diseases of the spinal cord, as tabes dorsalis, imperfect amaurosis is a frequent symptom." [1]

Treatment.—I shall now describe the various remedies used, or proposed in amaurosis.

Bloodletting.—Venesection is a remedy which is applicable to many of the varieties of amaurosis. When the local symptoms of inflammatory action of the retina, congestion, or indeed hyperæmia, of the visual nervous system generally, are present, in young, vigorous, plethoric individuals, the amaurosis resulting demands active general depletion, in proportion to the constitutional powers of the individual, and the severity of the local symptoms, followed up, and the good effects ensured, by local depletion, with leeches, or by cupping. When venesection is necessary, the patient should, according to the advice of Dr. Marshall Hall, be placed in the erect posture, and bled to incipient syncope; it being our object to relieve plethora, remove the local hyperæmia, and to prevent those changes of the delicate nervous structure which would speedily result. Bloodletting is injuriously practised in many forms of amaurosis. The permanent loss of tone of the minute arterial ramifications (capillary system) of the retina, the consequence of prolonged inflammation of that tunic, some forms of hyperæmia of the visual nervous system in individuals of an excitable nervous temperament and weak powers of body, all forms of this disease arising from debility, however produced, from anæmia, or in amaurosis from atony of the retina, are injured from loss of blood.

Arteriotomy, performed on the branches of the temporal artery,

[1] Müller's Physiology, Trans. Vol. i. p. 839.

is not uncommonly attended or followed by troublesome, or even dangerous consequences; since, when the circumstances of the case indicate general or local depletion, as much benefit may be obtained from operating on the vein at the bend of the arm, or by cupping at the nucha, or between the shoulders, at the same time that we avoid the dangers and inconveniences which arise from opening the temporal artery. Mr. Delagarde, in his "*Treatise on Cataract*," has convincingly shown the danger of repeated hemorrhagy, and the inefficiency of the operation itself, inasmuch as the irritation arising from the pressure "of tight fillets and hard compresses, must be injurious, by maintaining that sanguineous determination which the arteriotomy was intended to remove." "I will endeavour," he observes, "to illustrate the effect of determination to the head. A patient labouring under some epileptic affection, was desired by his physician to be bled largely. The anterior branch of the temporal artery was opened by his surgeon, who received the blood in a hand basin. Being a bold operator, he was perfectly gratified by the cross-fire, which proceeded from either orifice; yet he certainly was not aware that he had removed fifty-six ounces of blood. Satisfied with the quantity, he desired me to secure the vessel. This was not easily accomplished: the upper orifice bled very freely; upon the lower no pressure appeared to impose restraint; in defiance of my efforts, it continued to throw its column of blood with astonishing power. At length I succeeded in securing it by means of a needle. Now, had such an hemorrhage occurred in a situation where medical assistance could not have been readily procured, the patient might have perished.

"I shall proceed to cases of secondary hemorrhage. In three instances I have seen an aneurismal sac formed at the point of division. With the event of the first, I am unacquainted. In the second, a cure was effected by compression. In the third, a rupture took place during the night; and it was not discovered by the nurse until a very considerable quantity of blood had escaped. A few minutes after the discovery I saw the patient; he was pallid, his pulse scarcely perceptible at the wrist, his extremities cold, his mind affected with low delirium; yet the blood continued to issue, although, probably, with diminished rapidity. As a long time had elapsed after the operation, and as the sac was small, and constantly covered by his night-cap, it had not attracted attention. This patient, notwithstanding his youth, exhibited an exsangueous appearance, which could be attributed to the hemorrhage only.

"The circumstances under which this patient was placed, were favourable. He was in a public hospital, and had therefore an attendant at night, which, in similar cases, would have been deemed unnecessary. On the discovery of the bleeding, medical assistance was obtained before five minutes could have elapsed. Supposing such a case to have occurred in a remote country situation, it is probable that one fainting would have succeeded another during the night, and that the morning would have discovered the patient

in the last stage of exhaustion. Even then, it is more than probable, that many hours must have elapsed before a surgeon could be procured."[1]

Purgatives.—Purgative medicine, in one form or other, simple or compound, is applicable to nearly all the varieties of amaurosis. Active remedies of this class are necessary in those cases where general depletion is required, where we wish to deplete the system, and at the same time to derivate strongly to the primæ viæ. Saline purgatives, with the antimonio potassio tartras, calomel with jalap or scammony, are applicable formulæ. The formulæ most commonly used at the West of England Eye Infirmary, are pills of the compound extract of colocynth, with one-eighth of a grain of the potassio tartrate of antimony in a five grain pill, two or more being used according to circumstances, or two scruples of a powder (pulvis purgans), containing equal parts of powdered jalap, senna, and bitartrate of potassa. Purgatives may be required with a different object in view; namely, to correct chylopoietic derangements, obviate constipation, and unload the colon. Purgatives may be used in amaurosis, when arising from, or complicated with great debility (should dyspepsia or constipation be present) combined with cordials or tonics. Dr. Marshall Hall, in speaking of the treatment of acute disorders of the general health, observes, "The first object in the treatment of this morbid affection is, doubtless, to evacuate and regulate the bowels. It would be difficult, however, to determine whether more benefit has accrued from the use, or harm from the abuse, of purgative medicines in the present day. It does not appear to have been observed, that if these medicines be given unduly, they induce, or keep up, in many instances, the very disorders they were intended to remove. This is true, not only in regard to the stomach and bowels themselves, but also in regard to some of those organs which are so apt to be affected symptomatically. In fact, if the due limits in giving purgative medicines be exceeded, a state of irritation and distention is maintained in the alimentary canal, and of exhaustion and nervousness in the general system, more distressing than the original disorder.

"To obviate these inconveniences, purgative medicines must be given, in such cases as require their aid for a considerable length of time, in such a manner, and in such combination, as shall secure their good effects, without inducing the consequences which have been just mentioned. This is to be done by conjoining some cordial with the purgative, and by guarding against too considerable or too repeated doses of it; and by an attention, at the same time, to a mild and nutritious diet."[2]

It is of importance to distinguish between the effects produced by purgatives; namely, a simple increase of the peristaltic action of the intestines, or an increase of the natural secretions together with in-

[1] Delagarde's Treatise on Cataract, pp. 209, 210, 211.
[2] Dr. Marshall Hall's Commentaries on the disorders of Females. p. 41, 42.

creased peristaltic action; hence a distinction between the laxative and purgative operation of remedies.

In that form of amaurosis which we are now treating of, namely, amaurosis arising from or complicated with debility, our object in the employment of purgatives should be to evacuate the alimentary canal by increasing the peristaltic action, avoiding, on the one hand, the teazing and irritating operation of the medicine, and, on the other, the debilitating effects of excessive purging.

"Purging," observes Dr. Hamilton, "will undoubtedly debilitate the body, by causing a flow of fluids greater than usual, into the cavity of the intestinal canal, and probably by hurrying off the chyle, and precluding its passage into the system. It is in this manner useful and advantageous in some diseases. This effect, however, is not required in the diseases which are the subjects of the following observations, in which the sole intention is to evacuate the contents of the bowels, which, being out of the course of the circulation, are in a manner extraneous to the body. Purgative medicines, given under this condition, will not induce debility; on the contrary, in the state of disease of which I treat, the bowels, being excited to propel their contents, their functions are restored; appetite and digestion are improved; and the patient, so far from being weakened, is nourished, supported, and strengthened." [1]

Mercury.—This is a remedy of all others the most applicable, and the most worthy of confidence in amaurosis, so frequently used in diseases of the eye, and, indeed, of those of other organs. Mr. Travers observes, "I have been witness to its power in suddenly arresting the disease in too many instances, not to entertain a far higher opinion of it than of any other article of the materia medica." p. 305.

The object of employing mercury in amaurosis is to prevent disorganisation of the delicate nervous structures, by subduing inflammatory action, and promoting the contraction of the capillary vessels in hyperæmia, by a judicious, persevering, timely, effective, and mild use of this mineral. "But," remarks Mr. Lawrence, "if this treatment (antiphlogistic) be not found to remove the change which has been produced in the retina, we must have recourse to mercury, which is as decidedly beneficial in these cases, as in iritis, or general internal inflammation." [2]

As regards the preparation to be selected, we must be guided by the activity of the local symptoms, and the necessity that exists of speedily and effectually bringing the constitution under its influences. Calomel and opium, in the proportion of two grains of the former, and one-half of the latter, is the form employed in acute amaurosis (retinitis); whilst the pilula hydrargyri, or pilula hyd. chlorid. comp. with or without a narcotic, as conium, is used in the more chronic varieties.

[1] Hamilton on Purgative Medicines, edit. 8th, p. 21, 22.
[2] Lawrence's Treatise, p. 528.

The preparation of mercury being selected, adapted to the variety under treatment, it should be administered in such doses as are sufficient to produce a gently tender condition of the gums, as an indication of its constitutional action, and this condition of the gums supported by suitable doses of the mineral. Should the necessity exist, such a mild constitutional action of mercury as now proposed, might be continued for months, in healthy individuals, with great amendment in the amaurotic symptoms, and but little disturbance of the general health. Mr. Middlemore remarks that, "if the amaurotic symptoms are not at all relieved, if they do not in the slightest degree decline, when the gums are rendered sore and the system is placed under the decided influence of mercury, it is not necessary to extend its use further, for there is strong evidence in the fact so established, that the disease is not remediable by its employment; but, on the contrary, if they are meliorated, though not quite removed, then it would be advisable to maintain its action in a diminished degree by the administration of two grains of the submuriate with a small quantity of opium, once or twice daily." [1]

We may inquire what is the *modus operandi* of mercury in amaurosis? That it possesses considerable power over the capillary circulation, both in acute and chronic inflammation, as also in the passive dilation of vessels in hyperæmia, is evident; but in what does this influence consist? In order to solve the question, it is necessary to ascertain the condition of the capillaries which obtains in inflammation. Dr. Billing, in the third edition of his work on the First Principles of Medicine, observes, "the action of arteries is acknowledged to be contraction, whether considered muscular or not; but there is some difference of opinion as to the degree of action of the arteries in inflamed parts. It is very common to say, that in *inflammation* there is an increase of arterial action; but a consideration of the phenomena, and of the nature of arterial action, will show that in *inflamed parts* the *capillary arteries* are *weaker* in their action; that there is *diminished arterial action*, for the action of the arteries is contraction: now, the arteries in inflamed parts are evidently larger than before, less contracted, that is, acting less." p. 23, 24.

Dr. Billing shows, a few pages further on, that congestion consists in a similar dilation of vessels, only in a slighter degree. He observes, "the difference between *congestion* and inflammation is, that in congestion there is rather distention of vessels; in inflammation there is more or less alteration of tissue, connected generally with deposition in some way of coagulable lymph. The moment congestion is relieved, the parts are in their natural state; but even after inflamed vessels are unloaded, time is required for recovering their natural state. A good example is the congestion of the lungs in fevers, which often leaves no symptom when the fever is relieved; but after inflammation of the lungs has been stopped, the injured

[1] Middlemore's Treatise on Diseases of the Eye, vol. ii. p. 277, 278.

vessels require time for restoration." [1] Dr. Philip believes that the proximate cause of inflammation, as regards the vessels, is an atonic condition of the capillaries. [2]

To ascertain the effect of mercury in dilation of the capillary vessels, whether inflammatory or congestive, let us enquire what effect antiphlogistic remedies exert on the capillaries. Dr. Gooch has remarked that "the effects of remedies on a disease, if accurately observed, form the most important part of its history; they are like chemical tests, frequently detecting important differences in objects which previously appeared exactly similar." [3] We will enquire then, how cold operates in the treatment of inflammation? Cold is universally allowed to possess considerable power in checking the progress of phlogistic action, it does this by producing contraction of the capillaries. "Cold," says Dr. Billing, "will cause vessels to shrink, as cold lotion, &c. constantly applied." But to return to mercury, if there is dilation of the capillaries in inflammation and congestion, which few will dispute, (conditions most commonly producing amaurosis,) what is the modus operandi of mercury in checking that condition of vessels? Dr. Billing, in speaking of the therapeutic agents that we possess capable of effecting the removal of tumours, observes, "that medicines, such as mercury and iodine, &c., have an effect on the arteries themselves, directly or through the nerves, so as to make the inflamed capillaries contract independently of the vis a tergo, or state of the heart's action, or quantity of the circulating fluid." If mercury produces contraction of the dilated capillaries in inflammation, its action would necessarily be aided by evacuants, which would remove the distending force,—the vis a tergo. Mr. Pereira remarks that "the action of mercurials on the system is assisted by the use of blood-letting and emetics,—agents which promote absorption." [4]

[1] Dr. Billing's Principles of Medicine, edit. 3d, p. 26, 27.

[2] Dr. Philip observes that "the motion of the blood is retarded in the capillaries, in consequence of the debility induced in them; an unusual obstacle is thus opposed to its motion in the arteries preceding them in the course of the circulation, which are thus excited to increased action."

Dr. Copland, in speaking on the condition of the capillaries in inflammation, observes that "all the supporters of this doctrine (an atonic condition) err, in attributing little or no share to the inflammatory act to direct excitement of the capillaries,—in believing that excitement must necessarily be attended by constriction of these vessels, and that dilation of them is incompatible with increased vital action,—and in dismissing from their consideration the other morbid acts contributing to the production of the disease in its various stages and forms. That the extreme capillaries are weakened, dilated, and congested, and even that the blood stagnates in them at a more or less advanced period of sthenic inflammations, and at a very early period of the asthenic forms, have been stated above; but this condition is only one of the several constituting the disease, which, in no instance and in no stage, depends upon a singleness of event, as contended for by the espousers of this and the opposite theory." (Med. Dict. vol. ii. p. 398, sec. 145.)

[3] Gooch on the diseases peculiar to Women, p. 37.

[4] Periera's Materia Medica, part i. p. 445.

To produce its effects on the system, mercury is absorbed into the circulation, and exerts a very powerful influence on almost all the functions, but especially those of organic life. "The formation of albumen and mucus," observes Dieterich, "sinks to that of serum; the whole organic formation of the patient is less consistent and cohesive." [1]

Dr. Marshall Hall supposes that the effect of mercury on the inflamed capillaries is an erythema—a weakening of the cohesion of parts. He says, "not to dwell on what is well known, suffer me to direct your attention to the condition of the extreme arteries when fully excited by mercury. It is an erythema, an action which essentially weakens the cohesion of parts; but the adhesive inflammation is so exactly opposed to this, that both cannot be the result of mercurial action." [2] Mr. James observes, "mercury is another remedy which has a great, perhaps a superior anti-inflammatory tendency, especially where the inflammation affects glandular structures, serous membranes, or the eye; we cannot explain this on general principles by any known effect on the system; it appears to produce an action subversive of the inflammatory action in many cases, while in other and different cases it rather increases them. There is much reason to believe that it lessens adhesive inflammation, and increases often the ulcerative, and probably the suppurative." [3]

But whatever may be the proximate action of mercury on the inflamed capillaries, it puts a stop to the deposition of lymph, when the absorbents (in recent cases) remove that already deposited; a fact which the mercurial treatment of iritis beautifully illustrates. Dr. Thompson, in speaking of the influence of the bichloride of mercury in several chronic inflammatory diseases, observes, "very soon after the mouth is affected, the effused lymph is absorbed, and the whole of the secerning system acquires a new and more healthy action. Does this depend on the mercury altering the action of the capillaries which has produced the effusion of the lymph? The only reply which can be given is, that the bichloride in these cases, being given in small doses, enters the circulation and stimulates generally the glandular and capillary systems, giving a new action to the whole. Thence the further effusion of lymph being checked, that which was effused is taken up by the absorbents and thrown out of the system. When, however, the morbid action of the capillaries, which has caused these deposits, has been sufficient to produce a change in the structure of a part, no benefit follows the use of the bichloride, nor indeed of any other alterative." [4]

It is owing to this power of mercury over the capillaries, both in restraining the deposition, and promoting the absorption of coagu-

[1] Die Merkurialkrankheit, 80.
[2] Principles of the Theory and Practice of Medicine, p. 96.
[3] James on Inflammation, edit. 2, p. 179.
[4] Thomson's Materia Medica and Therapeutics, vol. i. p. 363, 364.

lable lymph, by promoting the contraction of the dilated capillaries, both in inflammation and congestion, and thus preventing those changes of structure which are so readily induced in the delicate organisation of the visual nervous system, that it is of such infinite value in the treatment of all those varieties of amaurosis which are of an inflammatory or congestive character.

During the administration of mercury the amaurotic patient should in a great measure be confined to his house, or at all events should not expose himself to all weathers, nor should he pursue his usual occupations and pleasures. He should dress warmly, avoid exposure to cold and wet, especially wet feet; take light but nourishing food, and pay great attention to the state of the stomach and bowels. He must avoid excessive sweating, and should such occur, he must be exposed to cooler air, and have the quantity of clothing lessened. A slight degree of salivation (tenderness of the gums) is necessary to indicate the influence of the mineral on the habit, whilst profuse salivation is not only unnecessary but injurious, and even cruel. The effect of mercury should be closely watched, for in some people, from idiosyncrasy, very small quantities of any mercurial will produce violent salivation. Under all circumstances therefore, beyond a certain degree, salivation must be checked.

Emetics.—Emetics and nauseants have been highly spoken of by Schmucker, Richter, and Scarpa, followed by medicines calculated to improve the condition of the chylopoietic viscera, invigorate the nervous system generally, but the nervous system of the eye in particular. There can be no doubt of the propriety of such a mode of treatment, where there is undoubted evidence of gastric or intestinal irritation. But if employed indiscriminately in most cases of incipient and imperfect amaurosis, to the exclusion of mercury or other more appropriate remedial measures, as appears to have been the case with the authorities already quoted, no wonder that the emetic mode of treatment has sunk into disrepute; since in some cases, not only has their employment been improper from the loss of time occasioned, but also where cerebral congestion was present, especially in plethoric individuals, was attended by injurious or even dangerous consequences.

Scarpa observes that "by an attentive examination of the nature and causes of the *imperfect amaurosis* which admits of a cure, it is found, from the careful observations of Schmucker and Richter, that this disease is most frequently derived from a morbid excitement or irritation in the digestive organs, from sordes, or from worms, especially in children, in which the eyes participate sympathetically. Agreeably to these principles, in the greater number of cases of *recent imperfect amaurosis*, the principal indication of cure which the surgeon ought to fulfil in the treatment of this disease, is that of unloading the stomach and primæ viæ of the crudities, worms, or morbific stimuli, and afterwards of strengthening the gastric system, facilitating the digestion, and at the same time exciting the whole nervous system, and particularly that of the eyes,

which are affected and rendered torpid by a sympathetic connection."[1]

Scarpa remarks that experience has taught the superiority of the *antimonium tartarizatum* to all other emetics, and that it answers the purpose afterwards, when given in small and divided doses, of a resolvent medicine, the action of which may be increased by combining it with gummy and saponaceous substances. He directs, in the treatment of *imperfect amaurosis*, three grains of tartarized antimony to be dissolved in four ounces of water, two table-spoonfuls of which may be given every half hour, until it produces nausea, and afterwards abundant vomiting. On the following day he orders some resolvent powders, (antiphlogistic purgatives), consisting of an ounce of the potassæ bitartras, and one grain of tartarized antimony, which are to be divided into six equal parts, and of which the patient is to take one in the morning, another four hours afterwards, and a third in the evening, for eight or ten days in succession. This medicine will produce a degree of nausea, and slight increase in the evacuations from the bowels, and even, after some days, vomiting. But should the patient during the use of these powders make ineffectual efforts to vomit, and complain of a bitter taste and loss of appetite, without any change for the better in the amaurotic symptoms, then the emetic should be repeated, and even a third or fourth time, if the presence of the morbific stimuli, the bitter taste, tension of the hypochondria, acid eructations, or tendency to vomit, render it necessary. For it frequently happens that the patient throws up nothing but water with a little mucus, on the first action of the emetic; but on its repetition, after the nauseating powders have been employed for some days, he will vomit a considerable quantity of yellowish-green matter, with great relief to the stomach, head, and eyes. (Loc. cit. p. 459, 460.)

When the stomach has been thoroughly emptied, he directs the following pills of Schmucker:

℞ Gum. Sagapen.
Galbani.
Saponis veneti ā ā ʒi.
Rhei optim. ʒss.
Ant. Tart. xvi grs.
Succi liquorit ʒi. M.

The mass should be divided into grain pills, and fifteen be taken night and morning for four or six weeks; or the pills made according to the recipe of Richter, namely,

℞ Gum Ammoniac
Assafœtida
Saponis Veneti
Rad. Valerianæ
Summitatum arnicæ ā ā ʒij.
Antim. Tartar. xviii gr. M.

[1] Scarpa's Treatise, &c., p. 458.

The mass to be divided into two grain pills; fifteen to be taken for some weeks three times a-day.

After the digestive organs are improved, and sight partly restored, Scarpa has recourse to tonics and stimuli, gentle exercise in the open air, and a mild nutritious diet. He directs the vapour of ammonia, likewise, to be applied to the surface of the conjunctiva.

"The phenomena," observes. Scarpa, "which are usually observed to happen in consequence of this treatment, are the following:—the patient, after having vomited copiously, feels more easy and comfortable than before. Sometimes, on the same day on which he has taken the emetic, he begins to distinguish the surrounding objects; at other times, this advantage is not obtained till the fifth, the seventh, or the tenth day; and in some cases, not till some weeks after the administration of the emetic, and the uninterrupted use of the opening powders and pills. As soon as the patient begins to recover his sight, the pupil is found less dilated than before, and also contracts more when exposed to the vivid light of a candle; and in proportion as the power of vision augments, this contraction and mobility of the pupil increases. Upon the whole, the cure is seldom completed in less than a month, during which time the use of local remedies calculated to excite the torpid action of the nerves of the eye should not be neglected."[1]

Notwithstanding the high authority of Schmucker, Richter, and Scarpa, in favour of the emetic treatment of amaurosis, it has completely failed in this country, especially the employment of tartarised antimony in emetic or nauseating doses. Mr. Travers has never seen a case decidedly benefited from it, though he has repeatedly given it a fair trial. And he prefers, even in cases of gastric disorder, where emetics have been especially recommended, employing a persevering use of blue pill, with gentle saline purgatives, and the tonic bitters.

Beer disapproves of emetics, even in the treatment of amaurosis arising from gastric disorder. He observes that they should be especially avoided in plethoric individuals, or those who have determination of blood to the head and eyes, or any acceleration of the pulse, since emetics never operate without a certain degree of violence; conditions which, he remarks, constantly obtain in this species of amaurosis. Beer declares likewise, that the violent operation of emetics not unfrequently converts this sympathetic amaurosis into complete loss of vision.

"The respect," says Mr. Lawrence, "justly due to the names of Richter and Scarpa would naturally lead us to try a mode of treatment which they have so strongly recommended. I have accordingly employed their plan in some instances which appeared favourable, but entirely without success. I have seen no case of amaurosis cured, nor even relieved, by such measures. On the contrary, after the ineffectual trial of emetics and nauseants, I have

[1] Treatise, p. 462.

removed the disease by the abstraction of blood and the other treatment already described. I have therefore entirely abandoned the use of emetics in amaurosis. I should not consider them safe, if general plethora, determination to the head, or active disturbance of the retinal circulation were present. As the full trial of the plan would require several weeks, we must also consider the loss of time that it involves. If the disease does not yield to our treatment, it will advance; and, from being imperfect and curable, it may become, in a few weeks, complete and incapable of cure."[1]

Turpentine.—Should mercury be contra-indicated from any cause, as the strumous diathesis, debility, old age, &c. in amaurosis, the result of retinal inflammation, turpentine would deserve a fair trial, since Mr. Hugh Carmichael has satisfactorily proved it to possess a similar power as mercury over the capillary vessels, in preventing the deposition of lymph in inflammation of the iris. Dr. Jacob remarks that "if inflammation of the iris be arrested or restrained by the administration of turpentine, as stated by Mr. Hugh Carmichael, and it seems agreed that in certain cases, probably of peculiar character, it is a valuable remedy, it should constitute one of the resources in inflamed retina."[2]

Antispasmodics.—We find a class of cases where the amaurosis depends on other causes besides inflammation or congestion of the visual nervous structures, and in which tonics and stimuli are generally indicated: in these cases, from the combination of hysterical and nervous symptoms, antispasmodics are likewise of service.

Tonics and stimulants.—Some forms of amaurosis arising from debility, induced by protracted hemorrhages, undue lactation, excessive evacuations, the depressing passions, the debility arising from fevers, especially typhus fever, profuse salivation, in a word from great prostration of the vital powers however induced, are greatly benefited by the use of various tonics, mild ale, porter, or other stimulants.

In the choice of tonics we must be guided principally by the exciting cause of the debility. Quinine or bark, the vegetable bitters, with or without the mineral acids, are applicable to most cases. Dr. Wallace has found bark of great service in the amaurosis and iritis which follow typhus fever. "But the important principle," says Mr. Middlemore, "of treatment in all these cases (amaurosis from debility of the system, or atony of the retina) would consist in the reinvigoration of the system; and here the question very naturally arises,—how is this to be accomplished? The use of ammonia, quinine, steel, various vegetable bitters, and the mineral acids, are all of them valuable remedies for promoting the accomplishment of this object, and when the debility is extreme I should prefer, at first, the frequent administration of the carbonate of ammonia, and afterwards the sulphate of quinine; where the debility has been induced by protracted suckling, the vinum ferri, or the tinctura

[1] Treatise, p. 544. [2] Cyc. of Prac. Med. Art. Amaurosis, p. 61.

ferri muriatis may be given, and, as the case may vary, the one or other of the previously mentioned tonics may be selected."[1]

The mineral tonics are especially adapted to amaurosis depending on anæmia of the visual nervous structures, and of these the preparations of iron, when they do not disagree with the stomach and bowels, are the most efficacious; they should be given in small but frequent doses, as more likely to produce the beneficial effects of the tonic, and, at the same time, to avoid the injurious consequences of irritation, or even inflammation, of the mucous lining of the alimentary canal. The occurrence of oppression or tightness of the thorax or at the epigastrium with severe headache, would either entirely contra-indicate the present use of steel, or at all events demand a considerable reduction of the quantity employed daily.

Should the preparations of iron disagree, bark is the best substitute, and of its various preparations the sulphate of quinine in one or two grain doses is the best; it may be given with the sulphate of zinc, or alternated with that remedy: or the sulphate of iron, in small doses, may be combined with the disulphate of quina with every prospect of its agreeing with the stomach, and powerfully invigorating the system.

Mr. Tyrrell observes, "when the cure is tedious, I find it advantageous to vary the form of the remedy occasionally, and to give it (iron) in combination with other preparations, as the sulphates of iron and zinc together, in pill or solution, or either, with the compound galbanum pill, or with ammonia, or other antispasmodics; these are useful additions when there is a marked hysterical diathesis; and when excess of nervous irritability exists, conium, hyoscyamus, opium, &c. may be beneficially employed."[2]

The most eligible forms for the administration of iron are the ferri potassio tartras (in solution, or with an aromatic), or the ammonio tartrate of iron; "its advantages over other chalybeates are its ready solubility in water, its palatable taste, and the facility with which it may be mixed with various saline substances, without undergoing decomposition. It contains more oxide of iron than the same quantity of sulphate. The dose for an adult is five or six grains in powder, pill, or solution. It may be exhibited in porter without being detected by the taste. It may be added to the compound decoction of aloes without suffering decomposition."[3] Another good form is the sulphate, or the carbonate of iron, as in the mistura ferri composita, or the pilulæ ferri compositæ. Mr. Tyrrell uses largely "a tartrate of iron, made by mixing fine iron filings with the crude super-tartrate of potash (equal weights of each); the mass is covered with distilled water, and submitted frequently to alternations of heat and cold, being occasionally boiled,

[1] Middlemore's Treatise, vol. ii. p. 281.
[2] Cyc. of Pract. Surgery, Art. Amaurosis, p. 101, 102.
[3] Pereira's Materia Medica, p. 556–7.

and afterwards exposed out of doors; fresh portions of distilled water are added from time to time, and the whole is frequently stirred: when the preparation has acquired a uniform dark reddish-brown colour it is fit for use; of a saturated solution in distilled water, I prescribe from half a dram to two drams twice or thrice in each day." (Loc. cit. p. 101.)

When chalybeates are administered with due precautions in anæmia (or hypæmia), they act as powerful tonics; the digestion is promoted, the pulse becomes slower, but fuller and stronger, the pale bloodless condition of the skin is exchanged for the healthy tinge; the lips and cheeks especially recover their natural florid colour, and with these symptoms of the increased quantity of blood, the patient regains the proper temperature of his body, the muscles recover their tone, and the amaurotic symptoms disappear.

Strychnine is occasionally used as an internal remedy in atonic amaurosis. Mr. Tyrrell has employed it as a tonic in the dose of one-twelfth of a grain in some cases, with benefit; he believes that its specific effects, produced by larger doses, would be injurious. A variety of other stimulating substances have been proposed; namely, camphor, nux vomica, phosphorus, arnica montana, naphtha, helleborus niger, calamus aromaticus, pulsatilla, &c.; and even millipedes have been strongly recommended.

No remedies have been more abused in the treatment of amaurosis than stimulants and tonics. "The generally prevalent notion that amaurosis depends on nervous debility or atony, has led at all times to the free employment of various means, supposed to possess the power of rousing the energy of the retina, or of the nervous system generally. Such means, or at least some of them, have been called *anti-amaurotic;* and they have not unfrequently been used empirically, one after the other, where the practitioner has not perceived any obvious indications of treatment."[1]

"A striking example," observes Mr. Lawrence, "was afforded by the case of a boy at school, about fifteen years of age. He came home to dine with his family, not having felt ill, nor made any complaint. In helping himself to wine, he poured it, not into the glass, but by the side. It was found, by examination, that the sight of one eye was very imperfect. A gentleman, who was consulted, directed a few leeches to the temple, on account of slight pain in the head, and opening medicine; measures of proper kind, but not sufficiently active. At the end of two or three days, the symptoms not being removed, the parents were informed that the imperfection of sight arose from want of tone in the nerve, which must be remedied by generous diet and tonic medicine: the pilula ferri cum myrrhâ was prescribed. Under this plan, in ten days, the eye first affected had become totally amaurotic, and dimness of sight occurred in the other. I saw the patient at this period, and

[1] Lawrence's Treatise, p. 545.

could only succeed in preserving imperfect vision in the eye last affected." (Loc. cit. p. 546.)

But Mr. Lawrence does not entirely discard the use of tonics and stimulants, although he considers the great majority of amaurotic cases to depend on inflammatory action, and to require mercury and the antiphlogistic regimen. He says, "tonics and stimuli, medicinal and dietetic, occasionally find place in the treatment of amaurosis. The disease, in some comparatively rare cases, depends on weakness of the nerve, or is connected with general debility. In other instances, the patient is reduced by our treatment, and perhaps by the distress of mind, often amounting to despondency, consequent on the dreadful calamity of blindness. Sometimes, when there is no longer any reasonable prospect of restoring sight, nothing is left for us but to enable the sufferer to bear up under his privation, by upholding the general powers, and restoring the tone of the nervous system. In these several cases, there are sufficient reasons for employing medicines of the class now under consideration. My objection is to their indiscriminate use, to their being ranked as primary and principal means in all cases of amaurosis, merely because the nerve is said to be *weakened*, and to the blind empiricism which often administers them in succession, because they have been called *anti-amaurotic*."—(Loc. cit. p. 547, 548.)

Local Measures.—Counter-irritation forms a very important part of the treatment of amaurosis, which is almost indispensable, and which is applicable to every form of the disease,—in acute retinitis, after bloodletting and purging, in chronic inflammation, or hyperæmia, as well as in amaurosis from anæmia, or atony of the retina. The best method of using counter-irritation depends on the form of the amaurosis, blisters applied in succession or kept discharging, setons, issues, moxas, the irruption produced by the ointment of the potassio tartrate of antimony between the shoulders, are all applicable forms. Stimulating pediluvia may be necessary in some cases. The main point in the management of counter-irritation is to keep up a sufficient discharge tolerably near the seat of disease, and to persevere in its employment for the necessary length of time. The employment of counter-irritation on the temple possesses no advantages over the same means when applied to the back of the neck, or behind the ears, and should therefore never be unnecessarily employed in that situation, from the disfigurement which a permanent cicatrix would produce. "When I first commenced practice," observes Mr. Middlemore, "I was in the habit of producing counter-irritation, by passing a few threads of silk through the lobe of the ear, and of applying to the thread various stimulating ointments. I also rubbed tartarised antimony and other irritating unguents behind the ear, but I was compelled to discontinue the practice, in consequence of the thickened and enlarged condition in which the part was left by the chronic inflammation these measures excited."[1]

[1] Treatise, vol. ii. p. 279, 280.

Strychnia—The very powerful influence of strychnine on the nervous system has suggested its employment in amaurosis. That it possesses a beneficial action in some cases, has been abundantly proved, though probably its virtues have been overrated.

The endermic application of strychnia, or in fact even its internal employment, is adapted only to amaurotic cases caused by atony of the retina, depending on, or entirely independent of, an asthenic condition of the general system. No possible benefit can accrue, but rather harm, from the indiscriminate employment of this potent poison in inflammatory or congestive conditions of the retina, or in those lesions of structure which are the necessary consequences of the state of hyperæmia. "An atonic state of the retina," says Mr. Middlemore, "or of some part of the nervous apparatus of the eye productive of amaurosis, when unconnected with a full plethoric habit of body, determination of blood to the head, or any tendency to apoplexy, and unconnected also with any structural change either in the retina or its immediate nervous relations, is very properly treated by means of strychnia, in a manner to be presently explained, and particularly if tonics and general stimulants have been successlessly employed. The bowels must be freely opened before we commence the use of strychnia, and aperient medicine must be occasionally administered during its employment."[1]

Mr. Middlemore asserts likewise that strychnia is well adapted to the case of miners when affected with incomplete amaurosis, who have been accustomed to follow their employment by means of a very feeble degree of light, and when impaired sensibility of the retina depends on too great delay in curing congenital cataract.

"*Mode of using the strychnia.*—Place a narrow blister above the eye-brow of the affected eye, or above the eye-brow on each side if both organs are affected, and after it has risen properly, snip away the elevated cuticle, and completely expose the raw surface, and having absorbed the serum, sprinkle a small quantity of strychnia upon its surface, commencing with the fourth of a grain upon each side; this quantity may be gradually increased, if vision be not improved, until two grains are placed upon the blistered surface every twenty-four hours. After the strychnia has been dusted or sprinkled upon the blistered surface, a small quantity of linen thickly spread with savine cerate should be placed over it with a view of preventing the frequent necessity of repeating the application of the blisters.

"I deem it prudent to use the strychnia only once in twenty-four hours, which gives sufficient time for its absorption, and at the same time maintains, constantly maintains, its full effect; and I conceive it to be advantageous to place the blisters above the eye-brow, on account of the probable especial effect of the strychnia upon the supra-orbitary nerve, in addition to its other more general influence. Of course, if any symptoms occur during its use, indi-

[1] Treatise, &c. p. 282, 283, vol. ii.

cating that it is either injurious, or that it is being used in too large a quantity, it would be desirable either to omit it altogether, or to diminish the quantity, or at all events to suspend its use for a time. Sometimes its application excites great local uneasiness, which is, for the most part, easily remedied by mixing it with a small quantity of flour, or adding to it a little of the powdered opium. I do not enter upon the symptoms which indicate that it is being used in too large a quantity, because they are precisely the same as those resulting from the administration of extreme doses of the same remedy, for the cure of various other maladies. Now, if vision were slightly improved soon after we had begun to apply the strychnia, and if the patient had occasional flashes of light flitting before the eye, there would be the greatest encouragement to persevere; but if after having increased the quantity for the space of a fortnight, and pushed the remedy as far as could be done in justice to the patient's safety, vision was in no way influenced, not in the slightest degree improved, it would be useless and improper to persevere in its use any longer." (Middlemore, loc. cit. p. 283, 284.)[1]

Mr. Liston's opinion in regard to the use of strychnia in functional amaurosis, is favourable. He observes that vision may be improved, if not wholly restored, by the removal of the exciting cause, and by carefully avoiding such circumstances as seem to predispose to the affection. After appropriate constitutional treatment, much good, he observes, is obtained from counter-irritation; "and I have in many cases witnessed the good effects of blistering the temples, and besprinkling the raw surface with the powder of strychnia, a practice very far from nugatory. On removing the blister, the cuticle and lymphatic effusion beneath are carefully scraped away, and from one eighth to one half of a grain of the powder dusted over the exposed cutis. The sprinkling is repeated daily, and the dose gradually increased. When the surface dries, a fresh blister is applied, and the use of the powder resumed. It may be employed, when gradually increased, to the extent of two grains on each temple; but if spasmodic twitchings and constitutional disturbance begin to show themselves, it must be immediately abandoned, and not resumed till after some days, and even then in diminished doses. In not a few cases, both of complete amaurosis, and of vision impaired to such an extent that the patient could merely distinguish light from darkness, I have by this practice succeeded in restoring the sight completely; in others, vision has been very much improved. Still by far the greater number of amaurotic patients are incurable, and even those who have derived benefit from strychnine, are, (I am strongly inclined to suspect), exceedingly liable to relapse."[2]

[1] Mr. Barnes, who has used strychnia several times and in several ways, says that he never saw the slightest benefit, or indeed harm, arise from its use in any form of amaurosis.

[2] Liston's Elements of Surgery, Pt. ii. p. 141, 142.

Mr. Middlemore has never seen amaurosis, on whatever pathological state its existence may depend, cured, "entirely removed," when its removal was attempted by the internal use of strychnia alone. He believes, however, that when combined with the endermic application, it has been used advantageously in a few instances.

"My opinions," he observes, "upon this subject, have been derived from years of laborious and extensive observation; and I am satisfied, that if those who have censured the practice will labour in the same way, they will meet with the same result, and will be prepared to recognise in this excellent remedy a means of rescuing many of their fellow beings from a state of blindness. But, it will be understood, that, in order that benefit may be obtained, a little judgment and discrimination must be exercised in selecting appropriate cases for its use; and I mention this the more particularly, because I, in common with other members of the Provincial Association, must be aware that many cases which have recently been published in various medical journals were quite unsuited to the application of the remedy; and, indeed, some of them were evidently rendered worse by its employment." (Loc. cit. p. 291.)

Dr. Mackenzie states that he has not seen any beneficial results which could be fairly attributed to the strychnia.

Electricity.—This remedy is adapted to the same class of cases as those in which strychnine is used with advantage. Mr. Hey, of Leeds, in his Medical Observations and Inquiries, published several cases which were benefited by electricity; and Mr. Ware placed considerable reliance on the remedy, probably in amaurosis depending on debility of the system or atony of the retina, since he considered it most serviceable in blindness produced by lightning. It is contra-indicated in plethoric individuals, when the amaurosis depends on active hyperæmia or acute or chronic inflammation, and the resulting organic change of the retina. Beer states that when slight and imperfect amaurosis depends on general plethora, or gastric and intestinal irritation, it is frequently rendered worse, nay, sometimes incurable, by galvanism and electricity.

Mr. Lawrence has seen no benefit arise from the use of electricity. He says that such a doubtful remedy is objectionable in the early stage of the complaint, because it supersedes other more efficacious means; and he considers such a powerful stimulus not devoid of danger, inasmuch as it is but little likely to tranquillise an over-excited organ. For this cause he considers it dangerons whenever congestion exists in the head, or active vascular disturbance in the eye. Should, however, the rational means which are indicated by a full consideration of the case fail after a full and judicious trial "the patient may (then) take the chance of this empirical remedy."

The method of application is either to insulate the patient and then draw sparks from the eyelids and neighbouring parts, or an

aura from the surface of the conjunctiva and from the eye-lids, or else to direct sparks or an aura against the eyes and eye-lids.

External stimulant applications.—Various stimulating applications have been recommended to be applied to the surface of the conjunctiva; as the vapour of ammonia or ether, a weak solution of cayenne pepper; and Mr. Middlemore remarks that M. Lisfranc "has even gone so far as to cauterise the cornea; at least, he recommends that the inferior segment of the cornea be touched with the nitrate of silver in substance, until a white cloudiness appears." (p. 281.)

Stimulating applications are adapted to the same cases as where strychnine or electricity may be used with safety and advantage. They are, however, frequently indicated in other forms of amaurosis, from the frequency with which chronic conjunctival ophthalmia attends or complicates congestive or inflammatory cases. Some mild stimulant should be chosen, as a collyrium of the sulphate of zinc, two grains to the ounce of distilled water, or equal parts of vinum opii and aqua destillata.

Sternutatories.—Sternutatories have been proposed in the treatment of amaurosis; little reliance can, however, be placed in remedies of this description; nevertheless should dryness of the conjunctiva and of the schneiderian membrane of the affected side be present, they well deserve a trial. Mr. Ware published many cases in which the chief treatment consisted in the use of a mercurial snuff. The snuff was made of ten grains of turbeth mineral (hydrargyri oxydum sulphuricum, Dub.) and one dram of the pulvis asari compositus, (Dub.) Mr. Ware remarks, "in order to be more exact in the use of this remedy, I have lately accustomed myself to prescribe one grain of the turbeth mineral to be mixed with twenty grains of the powder of liquorice, of snuff, or of sugar; and one fourth, or one third of this powder to be snuffed up the nose two or three times in the course of the day. And in those cases where the nose has been particularly dry, I have rendered the powder more effectual by directing the patient to inhale the steam of warm water through the nose previous to the use of the snuff." (p. 417.)

"A small pinch of this snuff taken up the nose is found to stimulate it very considerably; sometimes exciting sneezing, but in general producing a large discharge of mucus."[1]

Dr. Jacob observes, "Some appear to undervalue or even to discard the use of stimulating applications to the vicinity of the eye in cases of amaurosis, such as blisters, sternutatories, liniments, rubefacients, sinapisms, or pungent applications to the conjunctiva itself; but when we see violent sneezing produced by the impression of light, and recollect the other proofs of connection of

[1] Observations on the Cataract, Gutta Serena, &c., edit. 3, p. 405.

function between the nerves here, we are more than justified in giving trial to such means."[2]

There are many remedial measures which are applicable to all varieties of amaurosis, and which greatly increase the probability of ultimate success from more potent remedies; such are rest, more or less complete, of the disordered organs themselves, protection from powerful light, mild unirritating diet, tranquility and composure of mind and body, gentle exercise in the open air, (keeping in mind the precautions mentioned in the article mercury, when that mineral is used,) change of scene and employment, and pure country air.

Having thus given a general description of the symptoms, causes, diagnosis, prognosis, pathological anatomy, and treatment of amaurosis, I shall in the next place proceed with the consideration of the classification, and also with the peculiar and distinctive characters, treatment, &c. of the particular varieties of this complex disease.

CHAPTER III.

Section I.—*Classification of Amaurosis.*

Amaurosis has been classified by different authors in very different ways, and on different principles, according to the peculiar views entertained. The division into functional and organic which has been proposed and adopted by many eminent writers, is evidently pratically good, useful and correct. Mead divides amaurosis into the inflammatory, paralytic, and amaurosis from pressure. Some authors attempt no arrangement of this complex and intricate subject, but refer it to a variety of exciting causes, which are exceedingly dissimilar, or even diametrically opposite in their nature. Beer, again, places amaurosis under four classes: the *first* includes all cases characterised by impaired vision and other subjective symptoms, without any visible morbid alterations of the eye-balls; the *second* embraces those varieties of amaurosis in which evident organic changes have been induced in some part of the visual apparatus, in addition to the impaired vision, and other amaurotic symptoms complained of by the patient; the *third*, amaurosis characterised by subjective symptoms, with alterations in the form and activity of some part of the optic apparatus; and the *fourth* and *last* species comprehends amaurotic cases in which the symptoms of the three former species are combined.

Amaurosis may be idiopathic, or a primary affection of the

[2] Cyc. of Practical Medicine, vol. i. p. 67.

visual nervous structures, whether functional or organic, or sympathetic or secondary, and lastly symptomatic. Some forms of amaurosis are temporary or intermittent, others incomplete or partial (hemiopia,) and others again complete or entire (gutta serena.)

No division appears to me equally simple, yet correct and comprehensive, as the anatomical classsification; namely amaurosis from affections of the retina, optic nerve, and brain. The whole of these may be simultaneously disordered or diseased, or either one independently and separately. Magendie has satisfactorily shown the influence which the fifth nerve possesses over vision; we must therefore recognise amaurosis from affections of the nervus trigeminus. We must also notice amaurosis arising from congenital arrest or imperfection of one or the whole of the visual nervous textures (congenital amaurosis;) and lastly, certain amaurotic and nervous affections, which sometimes occur as independent diseases, but most commonly as symptoms only in amaurosis.

This division, expressed in a tabular view, will stand thus:—

Amaurosis from affections of the	Retina.	1. Inflammation, acute, chronic. 2. Organic changes the results of inflammation. 3. Pressure on the retina. 4. Injury from blows, wounds, &c. 5. Organic diseases, fungus hæmatodes, &c. 6. Atony of the retina.
	Optic nerve.	1. Optic neurites, acute, chronic. 2. Organic diseases and changes. 3. Pressure on the optic nerve. 4. Injury of the nerve.
	Brain.	1. Acute and chronic encephalitis, and results. 2. Organic disease within the cranium. 3. Sympathetic derangement. 4. Injury, concussion, laceration, &c. 5. Apoplexy and disordered circulation within the cranium.
	Visual nervous structures.	1. Debility. 2. Anæmia. 3. Hyperæmia. 4. From the operation of certain poisons.
	Nervus trigeminus.	1. Affections within the cranium. 2. Affections external to the cranium.

1. Congenital amaurosis.

Amaurotic and nervous affections.
1. Glaucoma.
2. Nyctalopia.
3. Hemeralopia.
4. Amaurotic cat's eye.
5. Myopia.
6. Presbyopia.
7. Inability to distinguish certain colours.
8. Hemiopia.
9. Muscæ volitantes, photopsia.
10. Strabismus and luscitas.
11. Diplopia and monoblepsis.

Sect. II.—*Amaurosis from Affections of the Retina.*

Retinitis acute.—Acute inflammation of the retina is by no means a frequent disease of the eye; thus, not more than six or seven cases have occurred at the West of England Eye Infirmary, during the last three years, out of nearly three thousand patients admitted during that period. The class of patients who are most frequently affected with retinitis, are those who from their employments and mode of life are predisposed to inflammatory attacks.

Retinitis rarely attacks both eyes simultaneously, nor is the inflammation confined, in general, to the retinal tunic; the iris, choroid, or sclerotica being more or less affected.

Symptoms.—Acute deep-seated pain of the globe, with an agonising feeling of tension and pressure, occurring in paroxysms, ushers in the disease. The pain is invariably aggravated towards night, and is accompanied by distressing and almost intolerable pain over the brow, which extends to the head, and frequently shoots or darts through the brain. The eye is exceedingly tender and intolerant of pressure, light is insupportable, and there is profuse lachrymation on every attempt to examine it. The orbicular muscle, as in strumous photophobia, is spasmodically contracted whenever the eye is exposed to the influence of light. Very little redness of the sclerotica attends the commencement of retinitis, a slight zonular arrangement of pink-coloured vessels of a very minute size surround the cornea, and the conjunctiva exhibits a few dilated trunks of a dark purple colour, probably the recti-branches. Vision is greatly impaired from the very commencement, and is accompanied by vivid flashes and scintillations of fire of a red or orange colour, or other morbid appearance of light.

"When the retina is affected with inflammation," says Mr. Wardrop, "the disease is marked by painful vision; intolerance of light; sparks of fire, or drops of a red colour, falling before the

eyes; little external redness; pain darting through the head; with more or less constitutional derangement."[1]

Photopsia alone, without zonular redness and symptomatic fever, cannot be considered as an indication of inflammation of the retina; thus Mr. Travers observes, that "the retina is sometimes, although rarely, the seat of inflammation; but it is an error to suppose that intolerance of light is a sign of this affection, as is clearly proved in the strumous ophthalmia, in which, though the intolerance is in excess, the retina is uninjured: and secondly, because the effect of inflammation upon a nerve of sense is to produce palsy, not increased excitability."[2] That such is the effect is disproved, however, by the occurrence of increased sensibility to the stimulus of light in retinitis; although the solitary occurrence of photopsia in amaurosis by no means characterises inflammation of the retina.

The pupil loses its clear black colour, and becomes greatly contracted; indeed, sometimes so much so, as to appear entirely closed, no central aperture being visible. The iris rarely escapes being discoloured, and is protruded forwards towards the cornea, whilst the pupillary margin is retracted. As the disease proceeds, the symptoms increase in violence; the zonular arrangement of the sclerotic vessels becomes more marked, but there is never any great vascularity of either sclerotica or conjunctiva, whilst the inflammation is confined almost entirely to the retina; the headach increases to an almost insupportable and maddening degree. "So severe," observes Dr. Mackenzie, "are the sympathetic fever and headach which attend retinitis, that it sometimes passes with medical men, who have not studied the diseases of the eye, for phrenitis or brain fever, the characteristic symptoms of the ophthalmia, from which the affection of all the other parts arises, not being sufficiently prominent to arrest attention."[3]

By and by, the retina, from having been acutely intolerant of the presence of light, becomes nearly insensible to its stimulus, the pupil dilates widely, and becomes immoveable, organic changes have been induced in the retina, which have destroyed its sensibility, the quantity and quality of the pigmentum nigrum is altered, the vitreous humour is in a dissolved state, and the hyaloid membrane destroyed. The pupil, by these morbid alterations of organisation, loses entirely its blackness and brightness, and presents a turbid greenish opacity, which is frequently complicated with cataract, and is likewise of a greenish tinge. When these changes are complete, and the green colour evident, they constitute acute *Glaucoma* (γλαυκος, green.)

Inflammation originating in the retina sometimes spreads to all the other textures of the globe, accompanied by very severe conjunctivitis and chemosis (ophthalmitis;) not unfrequently suppura-

[1] Morbid Anatomy of the Eye, vol. ii. p. 155, 156.
[2] Travers' Synopsis of Diseases of the Eye, edit. 2, p. 137.
[3] Practical Treatise, edit. 2, p. 545.

tion takes place, the globe is converted into a complete abscess, the cornea or the sclerotica give way, but more commonly the former, the humours escape, sometimes the whole contents of the globe; the tunics collapse, become completely atrophic, and are buried entirely in the orbit.

"To suppose," says Dr. Jacob, "that inflammation of the retina is always accompanied by those violent symptoms, would be dangerous in practice. The disease is often mild and insidious in its approaches, and marked more by defective vision, than by symptoms of inflammation."[1]

Retinitis may terminate in resolution at various stages of its progress, either spontaneously, or by active and efficient treatment, leaving amaurosis more or less complete, a dilated and immoveable pupil, a discoloured irrregular iris, with a sunken flabby condition of the globe, or a glaucomatous condition of the humours and lens, when the eye is tense, hard, and inelastic.

When the inflammatory process is very acute, these changes may be induced in an exceedingly short space of time; the sight is, even under a favourable and milder inflammation, but too frequently and irretrievably lost in the space of a few days, should the affection have been neglected or improperly treated. Indeed Mr. Travers has seldom seen an example of this inflammation which seemed to afford time for the beneficial operation of a remedy.

Retinitis, as an independent disease, is extremely rare; but it is probable that the retina participates in a greater or less degree in almost all the inflammatory affections of the globe. Mr. Lawrence remarks, that "the retina may, perhaps, be not much less liable to inflammation, than the iris; but we are less acquainted with the phenomena, because the part affected is out of sight, and the disease does not terminate fatally."[2] And Mr. Wardrop who seems to consider an increased sensibility of the eye to the stimulus of light as an indication of inflammation, observes, "in most cases of ophthalmia, in whatever texture of the eye inflammation commences, the retina generally participates; the degree being always indicated by the increase of the sensibility of the eye to light."[3]

Constitutional Symptoms.—Brisk symptomatic inflammatory fever always accompanies the progress of acute retinitis; the patient is languid, restless, and incapable of any exertion; the skin is hot and dry, especially that of the extremities; the face flushed; the pulse is hard, sharp, and rapid, or full and bounding; in some patients it is full and rapid, but readily compressible; the tongue is loaded with a thick white or yellowish crust: the stomach foul, nausea or vomiting being present; the bowels are confined; the mouth dry and clammy; and the patient is tormented by a most

[1] Cyc. of Practical Medicine, vol. i. Art. Amaurosis, p. 60.
[2] Treatise, p. 323.
[3] Morbid Anatomy of the Eye, vol. ii. p. 157.

insatiable thirst. All these symptoms are aggravated by a low position of the head. So great is the constitutional disturbance—indeed, so agonizing and unbearable the headach, the intolerance of light so excessive, the anxious expression of the countenance, and the great nervous excitement of the system, in the more acute cases, whilst the local symptoms are comparatively undeveloped, as closely to simulate the severer and more dangerous disease encephalitis. Retinitis sometimes occurs in combination with phrenitis.

The burst of retinal symptoms occurs suddenly, but is almost always preceded by constitutional disturbances; the patient is languid and listless, complains of great lowness of spirits and despondency, restless nights, anorexia, headach, nausea or vomiting, disordered bowels, the tongue is coated, the general surface is cold, and the patient chilly. Mr. Tyrrell observes, "retinitis I believe, always to be a consequence of some material derangement of the general or constitutional power, under which the balance of the circulation is easily disturbed; thus in the history of these cases, it is usually found that the patient has been complaining, or has been observed by those immediately about him, to have been unwell for some time previous to the burst of retinal inflammation. These general symptoms, however, become more manifest when the local disease is developed, and new symptoms present themselves as consequences of the retinitis."[1]

Causes.—When the retina is powerfully stimulated either by excess of vivid light, or by being strained by the careful inspection of very minute and brilliantly illuminated objects for any length of time, one of two very opposite pathological conditions may be induced—retinitis, or atonic paralysis; thus, the sudden impression of a flash of lightning may induce an immediate and perfect abolition of the retinal function, or the most active and violent retinitis.

Idiopathic retinitis usually occurs in predisposed individuals, whose health has been, as I have previously remarked, deranged for some days antecedently, from some cause producing excitement of the retinal circulation.

"Any thing," says Mr. Middlemore, "capable of suddenly impressing the retina with the stimulus of brilliant light as contrasted with its recent degree of stimulus; or of maintaining a state of intense excitement of the retina for any great length of time; or of exciting and maintaining an undue degree of vascularity of that membrane, may be classed among the causes of retinitis; thus, a sudden flash of lightning—sudden exposure of the eye to the bright glare of the sun on first rising in a morning—continued exposure of the eyes to the ordinary light of day after having been for a long time confined in a dark apartment—frequent exposure of the eyes to the glare of a large hot fire—employing the eyes much in the inspection of minute polished objects, or in reading or

[1] Cyc. of Practical Surgery, Art. Amaurosis, p. 81, pt. 1.

writing for an unusually long period—determination of blood to the head, or increased activity of the circulation of the eye in particular, may all be enumerated among the causes of retinitis.—From this statement it would appear that the individuals most liable to its attack are miners, smiths, cooks, astronomers, literary characters, and mechanics engaged in avocations requiring them to be constantly and closely inspecting the minute, polished, or vividly-coloured objects of their attention. I have witnessed the disease many times in attorney's clerks, and in persons employed as artists in the offices of architects; and certainly when it was the custom to employ the eyes by the aid of gas-light in the injudicious manner which was too often adopted on the comparatively general introduction of that mode of lighting apartments, the disease was particularly prevalent, though more generally in a chronic form. It is said that certain conditions of the system and particular diseases predispose to retinitis; such as general plethora, a determination of blood to the head, severe fever, phrenitis, and so on."[1]

The powerful reflection of light from a tract of country covered with snow has been known to induce retinitis in travellers. The Esquimaux, who inhabit Hudson's Bay, are so well aware of the loss of vision which arises from the exposure of the eyes to the dazzling brilliancy of a country covered with snow, (snow blindness,) as to use contrivances that act as preservers, which they call snow eyes. The snow eyes are made of wood or ivory, which are so formed as to fit and completely cover the eyes, and are fastened behind the head. In the centre of each piece there is a narrow slit or aperture which is usually horizontal, through which they see distinctly.

Violent blows and contusions of the eye by which the retinal structure is injured, or penetrating wounds frequently produce retinitis, with or without ophthalmitis. Sometimes we can detect no exciting cause. Dr. Jacob observes that "the cause of inflammation of the retina are as various as those of general inflammation of the eye-ball. The disease may arise from gout, rheumatism, syphilis, mercury (?), or typhus fever; or it may be idiopathic, without assignable cause."[1]

Prognosis.—So rarely do patients escape some permanent lesion of organisation, and consequent imperfection of vision, as the results of acute retinitis, even under the most active and judicious treatment, that the prognosis is always unfavourable; still, however, when the patient is seen early, and the disease is met by prompt and energetic treatment, the chances of a successful termination are very great. Relapse is extremely common, and a renewal of the acute symptoms is readily produced by causes which would have had no disadvantageous effects in a healthy state of the retina.

So rapid is the progress of the inflammation in the more acute

[1] Treatise on Diseases of the Eye, vol. i. pp. 794, 795.
[2] Cyc. of Pract. Med. p. 60, vol. i.

cases of retinitis, that disorganization is produced before the remedies have had time to influence the dilated capillaries; indeed patients rarely apply for relief until irremediable damage has been effected; when such is the case the prognosis is most unfavourable, the vision is permanently injured, and there is no small danger of the induction of general inflammation (ophthalmitis,) suppuration, and collapse of the globe. When only one eye is affected the other is in great danger of sympathetic disease, unless the most active preventive measures be instituted.

Dr. Mackenzie thinks that "the prognosis is not unfavourable, if a proper method of treatment be commenced before the pupil is much contracted, or the power of vision greatly lessened. If vision seems already extinguished, the prognosis is extremely unfavourable. Beer, indeed, had in two cases seen vision return on the arrest of the inflammatory symptoms, but in both a very considerable weakness of sight remained during life, and the patients could read large print only with much difficulty, and small print not at all. If the pupil be once closed, even before the retina appears to have become insensible, there is no longer any hope of preserving sight; for even should the pupil re-open in some degree, as it occasionally does on the inflammatory symptoms being arrested, yet it remains small and motionless, and the eye is still blind."[1]

Treatment.—In plethoric individuals, where the symptoms are very acute, the patient should be placed in the erect posture, and bled to incipient syncope. In these cases the greatest possible relief is obtained both of the local and constitutional symptoms, by the early use of the lancet. The necessity for a repetition of the venesection will be indicated by the violence of the constitutional and local symptoms; should the violence of the inflammatory fever, the agonising headach, the deep-seated and unbearable pain and tension of the globe be renewed, we must have recourse to a second general blood-letting. Cases, however, requiring such treatment are rare indeed. Blood-letting alone is quite inadequate to prevent disorganisation, though a powerful means of subduing the painful and alarming constitutional and local symptoms.—"Daily experience proves," says Dr. Jacob, "how unavailing mere depletion is found in iritis, or general internal inflammation, and even how unsuited to particular cases, however intense the symptoms." (loc. cit.) Local depletion by leeches or the cupping glass should be used after general depletion, and in less violent cases, or where the powers of the cónstitution are from any cause deficient, they form the only allowable or necessary means of abstraction of blood.

Mr. Tyrrell remarks that "the force of general vascular action is, in these cases, usually below par, and general abstraction of blood is therefore not only unnecessary, but even likely to prove injurious; it should never be resorted to whilst the pulse is easily

[1] Practical Treatise, p. 547.

compressible,—only when it is hard and incompressible; and then very cautiously. Even local bleeding, by cupping-glass or leeches, must be cautiously employed when the circulation is depressed and feeble, or its effects may be injurious instead of beneficial. Unfortunately, the loss of blood, generally or locally, often mitigates suffering for a time, and therefore induces a patient to solicit the repetition of it; and too often, the medical attendant, ignorant of its baneful tendency, follows up the deceptive plan of treatment. The disease cannot be arrested or cured by loss of blood: the only good in my opinion which can be effected by it, is lessening tension of vessels, so as to retard the disorganising process, and allow time for the operation of other remedies. I should only, therefore, abstract blood generally when the pulse is hard and incompressible, and then only in sufficient quantity to relieve the tension of the vessels; but, otherwise, I should prefer the use of leeches upon the palpebræ, as affording the means of emptying more readily the vessels of the affected part; and in particular cases, where the leech acts injuriously, I should apply the cupping-class to the temple or behind the ear; to the former spot if no hemicrania existed,—to the latter if there were any cranial pain or tenderness." [1]

Mercury.—Having had due recourse to blood-letting, we should place the patient (nothing contra-indicating) under the influence of mercury as speedily as possible. Calomel and opium, two grains of the former, and half a grain of the latter, should be given every four or six hours, until decided tenderness of the gums is produced; after which the quantity should be lessened, two grains of calomel and a half of opium night and morning, or only at night, being sufficient to keep the gums in a tender condition, avoiding salivation, which is unnecessary and injurious. This accords with Mr. Travers' opinion. "Mercury," he says, "should be introduced (when the amaurosis is recent and sudden) with all convenient rapidity into the system, I mean so as to ruffle in the least possible degree. No advantage is obtained by salivation; on the contrary, I think it hurtful. When mercury is beneficial, its efficacy is perceived as soon as the mouth is sore."

The mercury, to be efficacious, should be promptly used. "Much of the advantages to be procured from the use of mercury," observes Dr. Copland, "in this form of amaurosis, (inflammatory) as well as in iritis, depends upon the promptitude with which it is employed." (loc. cit. p. 50.) It is necessary to maintain a slight influence of the mineral for weeks, or even months, after the acute symptoms have been subdued, should zonular redness and increased sensibility to light, with blindness more or less complete remain; for this purpose, should calomel disagree, some milder preparation of mercury may be used, as pil. hydrarg. c. conio, or hydrarg. c. cretâ.

Turpentine.—Should mercury be inadmissible from any circum-

[1] Cyc. of Pract. Surg., part i. p. 81, 82.

stance, turpentine, which possesses a similar power over the capillary vessels in preventing the effusion of lymph, would be a valuable substitute. Dr. Copland remarks, "the success which has resulted from the exhibition of the *oleum terebinthinæ* in iritis induced me to prescribe it, after depletions, in two cases of this form of amaurosis (retinitis); and with satisfactory results in both. In persons far advanced in life, in scrofulous subjects, and in debilitated persons, this oil is certainly a less hazardous medicine than the mercury exhibited so as to affect the system." (Loc. cit.)

Mr. Carmichael gives the following method of using the oil. "I use," he observes, "the turpentine in this complaint (iritis) in drachm doses, given three times a-day. Its disagreeable flavour and nauseating effects I have found best obviated by almond emulsion. This circumstance is very necessary to attend to, the medicine being so unpleasant, that, if its taste be not in some way disguised, it is difficult to depend on patients taking it with the necessary regularity. In the formation of the emulsion, if double the quantity of confection directed in the London Pharmacopœia be employed, that is, two ounces to the half pint of water, it answers the above objects better: the residuum may be removed by straining.

"With an emulsion so made, the following is the formula I now generally adopt. R. Olei terebinth. rectificat. ℥i. Vitellum unius ovi. Tere simul et adde gradatim:—Emulsionis amygdalarum ℥ iv. Syrupi corticis aurantii ℥ij. Spiritus lavandulæ compositi ℥iv. Olei cinamomi guttastres vel quatuor. Misce. Sumat cochlearia larga duo ter de die.

"In a few cases it has been necessary to increase the quantity of turpentine to an ounce and a half, or two ounces, in the above mixture, the other ingredients being proportionally diminished, so that a drachm and a half or two drachms of it may be taken each time; but in general, when administered to the extent directed in this formula, it has very seldom indeed failed, though extensively tried, and in very urgent cases: the instances of its failure shall be presently noticed.

"The strangury, so frequently induced by the internal use of turpentine, is obviated by the usual means—flax-seed tea, and camphor julep: when very urgent, the medicine may be suspended for a time. The tendency to acidity in the stomach, which it sometimes causes, is relieved by the addition of carbonate of soda to the mixture; ten or fifteen grains to the eight ounces will be sufficient; some patients have said the taste was still further disguised by this addition.

"When the local inflammation is high, and acute pain is present in the eye and side of the head, the abstraction of blood from the temple by cupping, or the more immediate seat of the disease, by leeching, may be resorted to: the same practice is adopted where mercury is used. Nevertheless I have frequently, when these symptoms were very urgent, relied solely on the turpentine mixture, and with the most decided and expeditious relief; indeed, in some instances, where the pain and hemicranium existed as acutely as

they are, perhaps, at any time to be met with, patients have declared they were considerably relieved after they had taken it once or twice, and that its subsequent exacerbations were lessened in a very remarkable degree. It is in the former cases I have generally found it necessary to follow up the bleeding by increasing the quantity of turpentine.

"It is highly necessary to observe, that the condition of the bowels will require attention : the beneficial effects of the medicine appear to be in certain cases suspended when constipation is present, and are called forth, as it were, when this is removed." [1]

Counter-irritation.—After premising blood-letting, blisters should be applied behind the ears, or a large sized one opened at the back of the neck, or we may use the eruption of the tartar emetic ointment in the same situation. Counter-irritation may be injurious, if used too near the locality of the disease, or before the acute symptoms have been subdued by depletion. Issues, setons, moxas, the actual and potential cautery, errhines, and sternutatives, as recommended by different authors, are quite inapplicable to acute retinitis.

Besides these measures, an active purgative should be administered in the commencement, and a gently laxative effect produced by medicines during the continuance of the inflammatory symptoms. Perfect rest, also, of mind and body, abstinence, darkness, and seditive applications to the eye and eye-brow, are valuable auxiliary measures. "The eye," says Dr. Jacob, "should be protected from the irritation of strong light; but total darkness is unnecessary, and is probably pernicious, by increasing the sensibility of the retina. Care should be taken that, in excluding light, the free circulation of fresh air round the patient should not be interrupted. No circumstance has contributed more to the want of success, in cases of this description, than confinement of the patient to the respiration of an atmosphere contaminated by human effluvia."—(Loc. cit.)

Colchicum has been proposed when the patient is either gouty or rheumatic. The eyes, under all circumstances, should be protected, besides darkening the apartment, by a deep, ample green shade. Should abscess of the globe occur, it would be advisable to puncture the cornea, and thus save the patient from the great pain and torment which the distention would occasion, before a natural exit was provided for the matter, by ulceration, splitting, or sloughing of the cornea.

"Acute retinitus," observes Mr. Middlemore, "being so rapid in its progress, and as likely to lead to effects calculated to impair the integrity of a texture (the retina) most necessary to accurate vision, it becomes highly important that any remedies, which be employed, should be equally powerful in their operation, and prompt in the production of their effects. It appears to me, that the copious removal of blood, the rapid production of salivation, and the exclusion of light from the patient's apartment, combined with a low

[1] Observations on the Efficacy of Turpentine in Iritis, &c. p. 9—11.

unstimulating diet, are the measures to be chiefly relied upon in the management of this terrific disease." (Loc. cit. p. 797.)

Great care and judicious management is necessary in preventing relapses, after the acute symptoms have been subdued. The patient should use easy but regular exercise in a pure air; his diet must be mild and nutritious, and his bowels kept in a gently lax condition; he must avoid all cold and wet, especially wet feet; if any conjunctival redness remain, an astringent collyrium, as two grains of the sulphate of zinc to the ounce of aqua rosæ, or dilute vinum opii should be used two or three times daily. Any return of the symptoms of inflammation should be combated immediately by the application of a blister and leeches, and the alimentary canal thoroughly cleared out by an active aperient.

Case 1.—An interesting case of acute retinitis, with temporary, but complete loss of sight, caused by lightning, is recorded in the second volume of the *London Medical Gazette*, p. 58, 59. Jane Humphreys, eleven years old, was standing, on the 6th of May, 1828, in a school-room, with her left side towards the window, when a storm came on, and the room was strongly lighted by a flash of lightning, which produced instantaneous loss of sight in the left eye, with tingling pain in the globe. As the pain increased during the following days, Mr. Mayo was sent for. Repeated leechings on the temples, blisters behind the ear, and on the back of the neck, and mercury, so as to affect the mouth, were employed by his directions: under this treatment there was visible daily progress towards recovery.

The symptoms, on the 11th of May, were sense of heat in the eye-ball and tenderness on pressure; inability to raise the upper lid; extreme sensibility to light, when the eye-lids were held open; vision almost extinct. There was no increased redness, nor any change in the transparent media. Pain and tightness across the forehead; throbbing in the head; white tongue; frequent pulse.

May 20.—Objects could be distinguished; total want of power to raise the upper lid; she could bear the light when the lids were opened.

24.—The power of the levator palpebræ superioris was restored.

27.—Although the left eye appeared sound, and was used habitually with the other, it was weaker than before, and somewhat painful when exercised. She could read ordinary print with it when held near to the eye, or distinguish a pin, and pick it up from the ground; but the faculty of distinguishing colours was lost. In a yellow silk handkerchief, spotted with scarlet, she could point out the spots; but they appeared to her black, and the ground less black. She described white paper as a shade of black, and the leaves and petals of a rose as a deeper shade.

Retinitis may follow the operation of couching, as in the following case, from Mr. Hey's surgery.

Case 2.—"*Temporary Amaurosis from Inflammation.*—May 28, 1772, I couched both the eyes of Sarah Newscombe. The

subsequent inflammation was trifling, and disappeared the third day. June 12th, I repeated the operation on the left eye, and performed a third operation the 25th of the same month. The two latter operations were followed by no greater inflammation than the first.

"The cataract in the right eye, which had been broken at the first operation, disappeared so fast, that no repetition was required.

"When she could distinguish objects in the fields before the infirmary with the right eye, she was dismissed; with directions to return in about a month, that her eyes might be examined.

"Upon her return, I was surprised to find that she had lost that degree of sight in the right eye, which she enjoyed when she left the infirmary. Yet the cataract had not appeared again; nor was there any opacity to be perceived in the cornea, or capsule of the chrystalline. The pupil was too much dilated; and the iris did not contract upon exposing the eye to a pretty strong light. In short, the eye appeared to be affected with an *amaurosis*.

"Upon inquiry into the cause and progress of this unexpected complaint, the patient informed me, that in returning home, when dismissed from the infirmary, she had caught cold, which brought on an inflammation in the right eye, and a gradual loss of sight. The redness of the conjunctiva had nearly disappeared, but she still felt a tenderness of the eye.

"From a consideration of these circumstances, I was led to suspect that the complaint was of an inflammatory nature; and accordingly I ordered her to be bled immediately, and directed a purgative to be taken the following morning. These means afforded the wished-for relief, and the eye was restored to its former state.

"I saw this patient February 17th, 1799, twenty-seven years after the operation; and she then enjoyed her sight as completely as the loss of the chrystalline humour will admit." [1]

Case 3.—"A young woman, of florid complexion, and full habit, came to the London Ophthalmic Infirmary, complaining that she had lost the sight of one eye. She was cook in a family, and occupied, for several hours daily, before large fires, supporting her strength by free living. The pupil was slightly dilated, the iris motionless; a faint and scarcely perceptible pink tint was observed in the sclerotica, near the cornea: vision was dim, and had been so for three days. There was headache, flushed countenance, heat of skin, whitish tongue, and thirst. I considered the case to be pure retinitis, and to afford a favourable opportunity for showing whether the affection would be arrested by antiphlogistic treatment. At that time (now many years ago) I did not possess the knowledge of the powers of mercury in inflammation of the retina, which subsequent experience has given me. I directed a full bleeding from the arm, free purging, low diet, repose of the organ, and general rest. At the end of two days the sight was worse; cupping and a blister

[1] Practical Observations in Surgery, p. 93, 94.

were now ordered, but there was no improvement at the end of two days more. I now determined on trying mercury, and ordered two grains of calomel every few hours. Before the remedy had affected the system, vision was quite lost, or at least reduced to the mere power of distinguishing light from darkness. Full salivation, which took place in about a week from the first application of this patient at the infirmary, suspended all the symptoms; sight immediately improved, and was soon completely restored." [1]

Chronic Retinitis.—Chronic retinitis is most commonly induced by exercise of the eyes on minute objects brilliantly illuminated, or requiring great attention and straining of the eyes. Sometimes acute retinitis gradually subsides, and gives place to the symptoms of the chronic variety.

Symptoms.—The sclerotic redness in chronic retinitis is very slight; a few varicose vessels are observable on the conjunctiva, which is usually preternaturally dry. The pupil loses its clear black colour; the pupillary edge of the iris becomes irregular, displaced, and sometimes discoloured; vision is greatly impaired, and the patient complains of various amaurotic symptoms, especially of photopsia; he has a sensation of sparks and flashes of fire before the eyes, or brilliant metallic globules; "sometimes they are of a red colour, and resemble flowers with numerous petals, or falling stars." (Wardrop, vol. ii. p. 237.) An increased sensibility of light, an intolerance invariably accompanies the early progress of chronic retinitis, before complete disorganisation and loss of sensibility result. The pupil becomes contracted to an almost incredible degree; it is sometimes difficult to detect a central aperture at all; but as the retina becomes insensible, the pupil dilates, and becomes quite motionless.

Intolerance of light occurs in the early stages of some amaurotic cases, independently of inflammation, as also, in a very severe degree in strumous ophthalmia, so that it cannot be supposed to indicate a chronic degree of retinitis when uncombined with the other peculiar symptoms of that disease. Strumous ophthalmia occurs chiefly in children: vision, in those cases, is uninjured; for when the excessive photophobia is relieved, as in the twilight, they see perfectly; pustules are generally present on the edge or surface of the cornea, and the vascularity is of a fascicular character. In chronic retinitis vision remains imperfect, or entirely lost, in the darkness, although the intolerance of light is diminished, and the spasmodic contraction of the orbicular muscle ceases; instead of fascicular ophthalmia, the sclerotic redness, when any is present, is zonular. "The patient," observes Dr. Mackenzie, "seeks the dark, but there he keeps the eyes shaded and open; whereas, in the photophobia, which attends conjunctivitis, the eye-lids are generally kept shut, even in the dark. This circumstance affords ground for diagnosis."—(Loc. cit. p. 548.)

[1] Lawrence's Treatise, p. 324.

Strumous dyspepsia is another source of diagnosis, a disease which invariably accompanies the strumous constitution. "Under this title," says Dr. Todd, "we are anxious to draw the attention of the profession to the form of dyspepsia, which belongs to the scrofulous constitution; for, in our opinion, it presents a more characteristic feature of this habit of body than any physiognomical portrait which has yet been drawn of it. In this respect it is more to be depended on than either the fine skin, the clear delicate complexion, the light hair, large blue eyes, and dull sclerotica of one variety; or the foul, dull, swarthy coloured skin, the sallow complexion, and swollen countenance, the dark hair, and tumid upper lip of the other. It betokens, indeed, little familiarity with scrofula, to connect it with any particular temperament; for it belongs to all temperaments, to the sanguine, as well as the phlegmatic, to the nervous as well as the melancholic, and to all their varieties and combinations. But on whatever temperament the disordered habit, which we call scrofula, may engraft itself, we venture to say that this form of dyspepsia will also there be found; and accompanying the various symptoms which issue from it, it would be contrary to all reason to refuse to it an important share in the developement of this disordered habit, and in the production of the local affections, which have hitherto too much engrossed the attention, to the exclusion of a proper consideration of the constitutional disease." [1]

The progress of chronic retinitis is usually slow, in many cases very slow; the patient complains of frontal headache, and sometimes pain over the brow; the eye is firm and very tender to the touch.

There is a very chronic variety of retinitis, which bears more the character of retinal hyperæmia; it is marked by a gradual failure of vision, muscæ volitantes and photopsia, varicose dilation of the conjunctival and sclerotic vessels, and a gradual change of colour of the pupil, which has a turbid and greenish look. Not unfrequently there is in this variety diminished sensibility of the retina, with a thirst for light; the pupil is dilated, and moves sluggishly and imperfectly.

Mr. Middlemore observes that chronic retinitis "generally advances very slowly and without much pain, and the inflammation is usually limited to the retina, the sensibility of which is gradually destroyed by the deposition of lymph within or upon its texture, and it is not improbable that other organic changes also occur. I think this chronic state of disease possesses a tendency to establish a varicose enlargement of the choroid vessels, and of the arteria centralis retinæ and its ramifications." (Loc. cit. p. 798.)

Treatment.—It is rarely necessary to employ general blood-letting; nevertheless, should the symptoms be severe, and the individual robust and plethoric, it would be had recourse to with benefit. Local abstraction of blood by leeches and cupping must be used, in

[1] Cyc. of Prac. Medicine, vol. ii. p. 654.

proportion to the severity of the symptoms, and the constitutional vigour and powers of the patient. Mercury should be administered in such doses and in such combinations as to avoid irritation, and to produce and maintain a slight degree of tenderness of the gums, which must be perseveringly continued until the disease yields, or other considerations contra-indicate its further employment. Some source of permanent counter-irritation must be employed in the neighbourhood of the disease; a succession of blisters behind the ears, or to the back of the neck, or kept discharging by savine cerate, &c., a seton in the back of the neck, or a brisk eruption and discharge maintained by the local application of the ointment of the potassio tartrate of antimony to the same situation, are the most useful and applicable means of fulfilling this intention.

The exciting causes must especially be avoided; the eyes should be shaded, and the most absolute and perfect rest of the organs employed, as regards any objects requiring careful vision, but passive exercise, as in viewing the surrounding country during walking, riding, &c., may be beneficial. The greatest possible attention should be paid to the general health, such as by regular exercise, avoiding fatigue, country air, regular unirritating and nutritious diet, removing any local irritation, if existing, attention to the state of the bowels, which should be kept gently lax by the daily use of some mild purgative, warm clothing, &c.

Case 1. John Rabjohns, aged 40, was admitted as a patient of the West of England Eye Infirmary, under the care of Mr. Barnes, on the 17th of August, 1838. He had already suffered from the disease for more than a year. The pupils of both eyes were so much contracted as scarcely to be visible, with discoloration of their pupillary edges. Scarcely any useful degree of sight remained, but photopsia was still very troublesome; the sensibility of the retina was increased to such a morbid extent that the light was intolerable; a slight degree of pink-coloured sclerotic vascularity surrounded the corneal edge, and a few varicose conjunctival branches of a dark purplish hue were present, which apparently were the recti branches. The patient complained of severe occasional headach, and of nocturnal pain over the brow. He was directed a dose of the pulvis purgans (℈ij), a blister to be applied to the back of the neck, poppy fomentation, and two grains of the hydrarg. chlorid. with half a grain of opium, in the form of a pill every night.

On the 20th, he was ordered to continue with the same remedies.

27th: he was bled to twelve ounces, from an increase in the severity of the symptoms.

31st.—He was somewhat relieved by the venesection, and in addition to the remedial means previously prescribed, he was directed to use the unguentum antim. potassio tartrat. nuchæ.

The eruption from the tartarised antimony ointment, and a slight soreness of the gums was maintained for a considerable time, with but partial success, great contraction of the pupils, and intolerance of light still remaining.

On the 23d of December the dilute vinum opii was prescribed, which produced evident relief of the conjunctival symptoms.

Notwithstanding the activity of the remedial means employed, country air, and attention to the general health, he still continues occasionally to attend, (April 8th, 1839), complaining of great obscurity of vision, intolerance of light, and photopsia, in a diminished degree certainly, but the pupils still remain contracted to the utmost degree. [1]

Case 2d.—Ann Stuckey, æt. 30, was admitted at the Exeter Eye Infirmary, as a patient of Mr. Delagarde, on the 5th of October, 1838, affected with chronic retinitis. She complained of great intolerance of light, photopsia, headache, and almost total loss of vision. On examining the eyes, the pupils were discovered to be greatly contracted, and a scarcely visible zonular arrangement of sclerotic vessels around the cornea.

Treatment.—She was directed to apply a blister to the back of the neck, to take five grains of the pil. hydrargyri every night, and a pill of five grains of the compound extract of colocynth, with one eighth of a grain of tartarised antimony every morning.

Oct. 9th.—Symptoms much relieved, but the bowels were obstinately confined: to take two of the colocynth pills every morning. 16th.—Vision much improved: to continue the remedies already prescribed. 26th.—Still to continue the same medicines. Nov. 13.—She was ordered to use the tartarised antimony ointment to the nucha: under this treatment the inflammatory symptoms speedily subsided, and she recovered entirely the vision of both eyes.

Iritis with retinitis.—The retina almost invariably participates more or less in the inflammatory diseases of the iris, sometimes almost to an equal extent. Blindness, more or less complete, attends the progress of the inflammatory symptoms, and but too frequently permanent amaurosis results from organic changes of the retina.

When acute iritis is combined with retinitis, severe deep-seated tensive pain is experienced in the globe, the supra-orbital pain and headach are, as in acute retinitis simply, almost unbearable, especially at night; there is great intolerance of light, and profuse lachrymation on examining the organ. Zonular redness is fully formed in acute iritis, contrasting strongly with retinitis, which, when other textures are uncomplicated, however acute the symptoms may be, is never attended by such sclerotic redness. Mr. Middlemore states that the zonular arrangement of sclerotic vessels, which are very numerous and minute, and anastomose very freely, do not absolutely reach the corneal margin, but dip deeply into the sclerotica before they reach it, and in consequence that a white line

[1] John Rabjohns, since the notes of this case were taken, after employing various other remedies of similar kind and remedial action, received some slight benefit of the retinal symptoms, and after some months attendance was discharged as benefited.

is left around the margin of the cornea, which is most distinctly marked in very acute cases, where the vascular zone is fully formed, and where the disease does not extend to the cornea.

The iris quickly loses its natural brilliancy and radiated appearance, and becomes discoloured and thickened; the pupil, as the inflammatory symptoms increase, becomes more and more contracted, irregular, displaced, and retracted; the iris bulges forwards towards the cornea, whilst its pupillary edge is retracted, thus forming, as it were, a minute funnel; lymph is effused on the surface of the iris, near its pupillary edge, or the uvea is glued to the crystalline capsule, or minute abscesses form in the substance of the iris. Beer considers that displacement of the pupil, and condylomata of a reddish brown colour sprouting from the iris, are characteristic of syphilitic iritis. These condylomata are small abscesses, which form principally near the edge of the pupil; they sometimes attain a considerable size, when they acquire a yellowish colour. Displacement of the pupil, which may occur in all the forms of iritis, is usually upwards and inwards; it is by no means peculiar to iritis, nor can it be considered as diagnostic of the syphilitic variety. "I cannot," says Dr. Mackenzie, "regard it, then, as at all diagnostic or syphilitic iritis. That it is occasionally met with in this disease, I have no doubt; but I believe it to be a symptom, not so much of iritis as of an affection of the ciliary or iridal nerves." (Loc. cit. p. 513.)

Intolerance of light is, when the retina participates in the inflammation, very great, especially in its early stages. Mr. Wardrop attributes the increased sensibility to the stimulus of light to the morbid sensibility of the iris itself; for he observes, "when the proper substance of the iris is inflamed, extreme pain on exposure to light is one of the most striking characters of the inflammation. It may here be remarked, that the apparent redness of the eyeball forms no certain criterion of the degree of pain which a patient suffers in any species of ophthalmia; for those parts of the organ, which in their natural state are most influenced by light, become peculiarly sensible to it when inflamed, whilst the exposure to light seems to produce but a slight impression upon other parts, whose functions are not so immediately connected with vision, and which, from being most external, assume the reddest colour. Thus it happens that the iris, whose province is, from the peculiar sensibility with which it is endowed, to regulate the quantity of light falling upon the retina, suffers from exposure to light in a more remarkable manner than most other parts of the eyeball, when affected with inflammation." [1]

The zonular vascularity in iritis, varies in intensity with the violence of the inflammation, and should the morbid action be more severe in one part than another, it will be indicated by the greater predominance of the pinkish coloured sclerotic vessels at that part

[1] Wardrop's Morbid Anat. vol. 2. p. 34, 35.

of the sclerotica, which corresponds to the situation of the more intensely inflamed iris. Some degree of conjunctivitis almost always occurs in iritis.

Blindness, or at least great obscurity of vision, is one of the earlier symptoms of iritis with retinitis, which increases as the disorganizing process augments, independently of closure of the pupil, or opacity of the capsule of the crystalline lens, or effusion of lymph into the pupil. Mr. Carmichael observes, that in venereal iritis "intolerance of light, and defect of vision, are, in general, the first symptoms which induce the patient to seek for advice." [1] Mr. Carmichael's experience induces him to believe that venereal iritis usually, if not always, occurs in connection with the papular eruption. Imperfection, or loss of vision, may ensue, as the permanent result of iritis, after the inflammatory symptoms have been subdued by appropriate treatment. Thus Mr. Lawrence remarks, "that when the inflammation has extended to the posterior tunics, although it should have been arrested by proper treatment, it often leaves behind imperfection of sight in various degrees; and this may take place in cases of chronic, as well as of acute character. In an instance, where the inflammation was treated rather actively, and lasted a month, several thread-like adhesions of the pupil were produced, and the opening was contracted, but quite clear. The patient could read in a good light, but found a mistiness and dimness before the eye. Both eyes were affected in another patient, the inflammation being of a decidedly chronic character in the right, with very slight redness, and no heat or pain. At the end of ten weeks the pupil, which was clear, was fringed by short dark adhesions, and the patient could only make out large print with difficulty. His sight was afterwards much improved, but he could not read a small print by candle-light." [2]

Constitutional symptoms.—Severe inflammatory fever, headach, supra-orbitary pain, and nocturnal aggravation of the symptoms occur, in proportion to the violence of the local symptoms, and the degree to which the retina is affected.

When the progress of the symptoms is less active and violent (chronic iritis with retinitis), we observe less zonular redness and conjunctivitis; the pupil slowly contracts, its pupillary edge being irregular, discoloured, and retracted; the patient complains of but little pain, although there is considerable intolerance of light, and progressive deterioration of vision. Sparks, scintillations, or other photopsial symptoms, not unfrequently continue after the retina has become, in a great measure, insensible to impression of light.

Inflammation of the iris affords the most beautiful specimen of the action or influence of mercury on the inflamed capillaries, from the transparency of the cornea, so that all the changes induced by the constitutional action of this mineral are directly under the eye of

[1] Carmichael on Venereal Diseases, edit. 2. p. 95.
[2] Treatise, p. 296.

the practitioner. As soon as the constitution comes under the influence of mercury, it checks the inflammatory orgasm, and consequent deposition of lymph; previously deposited lymph, pus, &c. become reabsorbed; the iris regains its mobility and beauty; the pupil clears, the sight improves, the distressing feelings of the patient are relieved, and the zonular vascularity loses its peculiar character, and greatly diminishes.

Treatment.—Exactly the same remedies are indicated in iritis as in the treatment of acute and chronic retinitis; but in addition, the pupil should be kept dilated by belladonna, in order to prevent, and, if possible, remove adhesions. The belladonna, in the form of extract, moistened with water, or mixed with two or three parts of the unguentum cetacei, should be smeared over the brow, as a preferable mode of application to that of the solution dropped into the eye, during the continuance of acute inflammatory symptoms.

Iritis, with Amaurosis after Fever.—Mr. Wallace, of Dublin, has described, in the fourteenth volume of the Medico-Chirurgical Transactions, a peculiar form of amaurosis, with iritis, after typhus fever, headed, "An Essay on a peculiar inflammatory disease of the Eye, and its mode of treatment." He observes, that, "the complaint in question strongly resembles venereal iritis, not only in the appearance of the diseased organ, but also in the character of the patient's countenance. The eye-lids are half closed, reddish, and swollen; the vascularity of the sclerotica and conjunctiva being greatly increased, with a peculiar dark brick-red colour. The iris is altered in colour, generally greenish, and incapable of motion; the pupil contracted, with its edge thickened and irregular. The cornea is dim, with an appearance like that of glass which has been breathed upon. There is often a turbidness of the aqueous humour; and a pearly appearance of the parts behind the iris may be observed by looking through the pupil. There is great intolerance of light, and a copious, hot, lachrymal discharge. The vision will be found, for the most part, so extremely imperfect, that the patient can merely distinguish light from darkness, and he is often tormented by flashes of light, which shoot across his eye, and these occur more especially in dark places; or he is troubled by brilliant spectræ, or by the constant presence of muscæ volitantes. There is very considerable pain, which returns in paroxysms, and these are almost always more severe at night. The pain is sometimes referred to the ball of the eye, sometimes to one of the lids, sometimes to the temple, or the circumference of the orbit. It is, one while, compared to the action of a saw on the bones; and, on other occasions, to the darting of a sword through the eye-ball. The disease occurs as frequently in the male as in the female. The youngest patient, of whose case I have a note, was ten years of age, and the oldest thirty-six years. It seldom attacks both eyes; and the right eye suffers more frequently than the left. Of forty cases which I have noted, there were only four which had the disease in the left eye, and only two who had it in both. The general health seldom

appears to be much deranged. The tongue is, for the most part, slightly white. There is often considerable thirst, and the pulse is somewhat accelerated. The bowels are frequently confined, and there is occasionally a disposition to nausea. The disease has occurred more generally in those who have been the subjects of relapse, but the period at which it takes place, after the first attack of fever, is extremely uncertain. In some it has appeared immediately, in others not for months. Sometimes a state of apparently full health has intervened between the attack of fever and the commencement of the inflammatory disease of the eye; on other occasions, the general health has seemed imperfect from the time of the fever, until the occurrence of the ophthalmic affection."—(p. 286.)

Mr. Wallace goes on to say, that the disease possesses two distinct stages; but during the first stage, the amaurotic symptoms only exist; but in the second, those of inflammation are superadded. The length of time that the amaurotic symptoms continue uncombined with those of inflammation, and the occurrence of the amaurosis after the fever, are extremely uncertain. Occasionally muscæ volitantes, and dimness of vision, occur at or before the time of convalescence from the fever: yet the inflammatory stage has not supervened for weeks, or even months; while, on some other occasions, the dimness of vision, &c. has not commenced for several days, weeks, or months, after the febrile attack, and has then been immediately followed by the symptoms of inflammation. Mr. Wallace never saw a case in which, upon strict inquiry, amaurotic symptoms, in greater or less degree, had not preceded the inflammation. He found, likewise, that the inflammation uniformly subsided some time before the amaurosis disappeared, and frequently before it had been in any measure mitigated in severity.

Mr. Wallace found that an antiphlogistic and mercurial treatment were insufficient, and even injurious, when accidently he discovered the efficacy of bark by the speedy recovery of a patient who took it on account of the complication of an intermittent. He was induced to employ bark from this occurrence in other cases, and with constant and striking success. He feared to employ it in the first place, in severe cases, without previous blood-letting and purging; but he remarks, "latterly, whenever a case has presented itself, I have prescribed the bark alone, or simply with such medicines as were suited to the regulations of the bowels, and with the most decidedly good effects. Indeed, I have thought that the abstraction of blood has, on some occasions, considerably retarded the cure; yet cases may occur in which bleeding and purging may be necessary." Mr. Wallace uses half-dram or dram doses of powdered bark three or four times in the twenty-four hours, or two grains of the disulphate of quinine.

Other authors, who have written on this disease, have found that the antiphlogistic treatment, with mercury and belladonna, have been quite sufficient to cure the symptoms.

Choroiditis.—Choroiditis is most common in the strumous dia-

thesis; rarely occurring in elderly people, or in children; but most frequently in adults below the middle period of life. It is chiefly characterised by deep-seated, throbbing pain of the eye-ball, sensation of pressure and tension of the globe, and impaired vision. The vision is disturbed by muscæ volitantes and photopsia, and objects appear distorted, imperfect, and as if seen through a mist. Headache and pain over the brow are present, symptoms which have frequently a remittent character, and are invariably aggravated at night.

During the early stage of choroiditis there is but little redness, a few varicose branches of the conjunctiva (the recti-branches) are present, which terminate in a faint and imperfect zonular arrangement of very minute vessels of a purplish colour around the cornea. The symptoms advance rapidly, and vision soon becomes extinct. As the inflammation increases, the sclerotic vascularity becomes more and more apparent, but there is never much general redness, or any very active conjunctivitis.

As the disease proceeds, the pupil contracts and becomes displaced, generally upwards and inwards; its motions are impaired, and its edge irregular. The iris changes colour, and becomes dull, and frequently adhesions form between the capsule of the lens and the edge of the pupil, (synechia posterior,) which appears thickened and retracted. Eventually the pupil becomes blocked up with a web of lymph, which is effused from the thickened margin of the pupil, and the capsule of the lens becomes opaque.

The sclerotic coat, which always participates, more or less, in the inflammatory process ("sclerotico-choroiditis,") as the inflammation proceeds, becomes attenuated and of a blue colour, from the varicose vessels of the subjacent choroid becoming apparent through it. This appearance in the first instance is scarcely perceptible, but as the attenuation of the sclerotica proceeds, it acquires in advanced cases a deep blue tint. The discolouration is first apparent about the eighth of an inch behind the edge of the cornea, surrounding in some cases the entire cornea, but most frequently only a part. The eye feels remarkably hard and tense.

The attenuated parts, at length, from being merely discoloured begin to form protrusions, (staphyloma sclerotieæ.) Sometimes this protrusion is partial, and occurs in two or three parts only; at other times the whole circumference of the eye is enlarged; but most commonly the bulging or protrusion takes place more or less generally around the cornea.

Effusion not unfrequently occurs between the choroid tunic and the retina, forcing the retina forwards in the form of a cone, the apex of which is at the optic nerve, and the base in front. The vitreous humour becomes absorbed from the pressure. This condition of the retina, when seen through the pupil, resembles a deep-seated cataract, or the advancing disease in fungus hæmatodes.

Opacity of the cornea does not always result from choroiditis, although a frequent attendant on severe cases. Occasionally the

circumference of the cornea becomes cloudy or opaque, somewhat resembling a broad arcus senilis, or white spots occur, sometimes of considerable size, which Dr. Mackenzie observes, are "more the effect apparently of interrupted nutrition than inflammation." Very rarely the whole of the cornea undergoes a staphylomatous disorganization, with difficulty to be distinguished from the degenerated sclerotica.

Constitutional symptoms.—The violence of the sympathetic inflammatory fever varies with the intensity of the local symptoms, the constitution, temperament, &c. of the patient; there is dyspepsia, restlessness, languor, and declination for any exertion bodily or mental. The tongue is coated; the circulation disturbed; the mouth dry and clammy, with thirst; there is complete loss of appetite, nausea, and disordered bowels; and lastly, the skin is hot and dry.

Prognosis.—When the patient is seen early in the complaint, and active and judicious means are used, our prognosis may be favourable, provided that the retina is sensible to the impression of light, and the pupil not considerably contracted, nor the capsule of the lens opaque. It is necessary to remember, however, that great intolerance of light, sensations of sparks, flashes of fire, or brilliant globules, and other varieties of photopsia, frequently continue to harass the patient after all useful vision is entirely lost, the power of distinguishing between light and shade alone remaining. By a combination of operative and remedial measures, we can sometimes restore the sight more or less perfectly, even after the pupil is closed and the lens opaque, provided that the patient retains some slight degree of vision, and the sclerotica is uninjured. There can be no hope remaining if the choroid protrudes at several points, the pupil is entirely closed, and vision, even the discrimination of light and darkness, lost. Much depends likewise on the duration of the affection; the longer the continuance of the disorganising process, the greater danger of permanent alteration of organisation, and the less of complete and permanent recovery.

Treatment.—It is necessary to resort without delay to the decided and active employment of antiphlogistic means; we must deplete the system by general and local blood-letting, active purgation, &c., in proportion to the activity of the local symptoms, the powers of the individual, and his age and constitution. The constitution must be brought as speedily as possible under the influence of mercury, by calomel and opium, and afterwards used in sufficient doses to keep up a tender condition of the gums. After general and local blood-letting, in acute choroiditis, blisters should be placed behind the ears, or to the back of the neck, or we may produce an active discharge by the tartar emetic ointment.

Turpentine is of the same utility, and is indicated under the same circumstances as in iritis, or in retinitis.

Arseniate of potassa.—"Under the influence of this medicine," says Dr. Mackenzie, "I have had the satisfaction in a number of

instances to observe the varicose vessels shrink, the blindness become less, the tumour of the sclerotica and choroid fall, and the patient's vision and health improve. The dose with which I have generally commenced, is the thirty-second part of a grain, thrice a-day, in the form of a pill." (loc. cit. p. 542.)

As auxiliary means, we should maintain the most absolute rest and quiet of both mind and body, but especially of the organ itself; a large deep green shade, at once calculated to shade and protect the eyes, and to allow a free access of air, should be worn, since the small shades commonly worn which cover one eye only, may induce strabismus, and frequently, from the retained caloric, do more harm than good.

Paracentesis oculi.—When a serous collection of fluid accumulates between the retina and choroid, it is of the greatest importance to evacuate it, both as regards the relief of the symptoms, and the prevention of permanent amaurosis. A fine grooved needle should be entered a few lines from the edge of the cornea. And directed obliquely backwards towards the centre of the vitreous humour, avoiding the crystalline lens. The instrument need not penetrate deeply, one or two lines will be sufficient. A small quantity of glutinous serous fluid is discharged, with a little blood, which produces great relief of the feeling of tension and pressure of the globe, and the distressing pain of the head and brow. When the fluid re-collects, it may be again evacuated by a similar operation.

Choroiditis occasionally assumes a very chronic insidious form, which is chiefly characterised by impairment of vision, muscæ volitantes, photopsia, and at length thinning of the sclerotica, and protrusion of the choroid.

Ophthalmitis.—Violent inflammation of the eye occasionally commences with the symptoms of acute retinitis, but spreading to the other tunics, terminates in general inflammation of the globe and conjunctiva, and producing suppuration of the eye-ball; the cornea or sclerotica slough, ulcerate, or give way under almost insufferable agony, when the tunics collapse, the pain and inflammation diminish, and not unfrequently the eye atrophies and sinks into the orbit.

Symptoms.—When inflammation simultaneously occurs in all the tunics of the eye, it gives rise to violent pain, and a deep-seated feeling of tension of the globe, which is almost insufferable, and extends to the orbit and brow with such severe cephalalgia and darting pain through the brain, as even to be mistaken by superficial observers for an affection of the brain. The eye itself is exceedingly tender, and is moved with difficulty; the access of light is painful, and the lids are closed by spasmodic contraction of the obicularis palpebrarum. Photopsia in the form of scintillations or flashes of fire is almost constantly present, from the inflamed condition of the retina, even during the night, or in perfect darkness. An abundant discharge of scalding tears occurs on every attempt to examine the eye.

Objective symptoms.—On examining the eye, we observe, if at an early period of the disease, the highly developed zonular arranged sclerotic vessels, and the reticulated scarlet-coloured conjunctival vascularity, readily moveable over the subjacent claret-coloured zone; but at a later stage, the conjunctival inflammation becomes so violent as to hide completely the sclerotic redness. At this stage of the disease, effusion occurs beneath the conjunctiva, constituting chemosis, which lifts that membrane over the corneal edge, sometimes to a great extent, and the eye-lids become enormously swollen, and sometimes everted, especially the upper one. The cornea sloughs or ulcerates from the inflammation and impeded nutrition; the iris becomes dull and loses its radiated and brilliant appearance; the pupil irregular, displaced, and contracted, afterwards dilated and oblong; the humours cloudy, and the lens opaque. The secretion from the conjunctiva and lachrymal gland are diminished in the commencement of the inflammation, but subsequently profuse and scalding. If these symptoms are unchecked, suppuration speedily occurs, when relief is not obtained until the matter is evacuated, as I have just observed, either by an artificial aperture, or by sloughing, &c. of the cornea, or less frequently the sclerotica. In more favourable cases, under active and early treatment, the inflammation may entirely be checked before the eye has received any severe damage, but in the generality of cases, the cornea is left nebulous or partly opaque, the pupil adherent or closed, whilst from the violence of the inflammation the retina has suffered organic mischief, and vision is permanently impaired.

Treatment.—Our treatment must be actively and decidedly antiphlogistic; general and local blood-letting, purging, the potassio tartrate of antimony, mercury, absolute rest of the eye, and indeed of the whole body; when the pain and feeling of tension of the globe is excessive, the aqueous humour may be evacuated, according to Mr. Wardrop's plan: low diet, darkness, and after the subsidence of the more acute constitutional irritability, blisters, &c., are also applicable modes of treatment. Soothing fomentations and collyriums are useful, as tepid poppy decoction, or a weak solution of the acetate of lead, &c. Should general suppuration of the globe occur, an artificial exit may be given to the matter by a free incision in the cornea. And lastly, to prevent sloughing of the cornea, when violent inflammatory chemosis is present, a free division of the sclerotic portion of the conjunctiva extending close to the cornea, and avoiding the principal blood-vessels, by making the incisions correspond to the interval between the recti muscles, must be practised, as advised by Mr. Tyrrell in purulent ophthalmia.

SECT. III.—*Amaurosis from the Results of Inflammation of the Retina.*

Organic changes of the retina, whether the results of retinitis simply, or of ophthalmitis, choroiditis, or iritis, necessarily produce amaurosis. The symptoms, on examination, vary, of course, with the particular disease which produced it. In disorganisation from pure retinitis, there may be but a slight dullness of the pupil, which, on close inspection, presents a deep seated gray or buff-coloured opacity, produced by the change of colour induced in the retina by the deposition of lymph within its texture. The pupillary edge of the iris is usually discoloured, more or less adherent to the capsule of the crystalline lens, slightly retracted and irregular, or the iris itself motionless and discoloured, in proportion to the extent to which the iris participated in the previous inflammation. In other inflammatory affections of the eye, by which the retina has been injured, the sclerotica, cornea, iris, conjunctiva, choroid, &c., may all have undergone severe and irreparable injuries.

In these severe cases, the vision may be entirely destroyed, or the patient may retain the power of distinguishing large and well lighted objects; in general, all objects are enveloped in mist, and imperfectly discerned, their outline, or their more remarkable appearances and colours may be recognised. A fixed solitary musca (scotoma) or muscæ volitantes photopsia, and other symptoms common to many of the forms of amaurosis, generally annoy the patient.

Organic changes of the retina are of frequent occurrence from the number of inflammatory diseases complicating the retina. The retina is converted into a tough buff-coloured membrane by the extensive deposition of lymph, or its nervous layer may be softened or absorbed, or indurated or ossified, &c., and lastly, its central artery may be left in a dilated, varicose, and atonic condition.

In amaurosis from organic changes of the retina, the consequences of inflammation, our prognosis cannot be otherwise than unfavourable; nevertheless vision may frequently be improved by appropriate treatment, in recent cases, and where the sight is not materially injured, or extensive and irremediable changes induced in other parts of the eye. Any appropriate means of counter-irritation may be used, and mercury or iodine, in alterative doses: great attention being paid to the general health at the same time.

When an atonic varicose dilation of the ramus centralis retinæ follows inflammation of that tunic, a similar condition of the sclerotical and conjunctival vessels are frequently present at the same time; the pupil is dilated and motionless; vision is very imperfect, cloudy, and interrupted by muscæ—symptoms which are increased by any causes which hurry the circulation generally, or that of the retina simply. It is aggravated by bleeding or other depletory measures; but great advantage is frequently obtained by stimulating

vapours, &c., to the conjunctiva, electricity or galvanism, but especially by the endermic application of strychnia to the temples. "My own practice," observes Mr. Middlemore, "has furnished me with several examples of this variety of amaurosis which have been certainly amended by the use of some form of active counter-irritation (attended by a pretty copious secretion of pus) in the temples, by the employment of strychnia, and also by the application of electricity. I have neither found free depletion, nor the administration of mercury so as to excite ptyalism, in the slightest degree beneficial, neither have I derived advantage from any astringent, stimulant, or other collyria or unguents, which I have occasionally tried." [1]

Dr. Jacob thinks that mercury (in the treatment of amaurosis from organic changes of the retina, the consequences of inflammation) should not be indiscriminately used, and a guarded prognosis of the result of its administration made. He observes that "to rouse the activity of the impaired function, or to raise the sensibility blunted by disorganisation, impressions on the extremities of the fifth pair of nerves may be advantageously resorted to; hence the practice of repeated blistering all round the orbit, or of applying stimulating liniments, or sinapisms, in the same situation. With the same view, sternutatories may assist, and perhaps, in certain cases, electricity." [2]

Sect. IV.—*Amaurosis from Pressure on the Retina.*

Temporary or permanent amaurosis may result from pressure either on the concave or convex surface of the retina. This will account in some cases for the amaurosis which has been induced by the depression of a firm lens. Dr. Mackenzie observes, "if the lens is hard, and the depression rudely performed, the retina, and even the choroid, may readily be lacerated in the operation, and the eye deprived in an instant of all chance of recovering the power of sight. If the lens is left resting on the retina, it is reasonable to conclude that this of itself will prevent vision. Should it become loosened from its new situation, and rise a little from the retina, the sensibility of this membrane may perhaps return; but in other cases, even after the pressure is thus removed, the amaurosis may continue."

When amaurosis is produced by the pressure of a firm lens, violent vomiting and pain of the eye usually attend. Mr. Guthrie remarks, that when vomiting depends on injury of the iridal nerves, iritis is likely to be the consequence. "If, on the contrary, the vomiting has been caused by an affection of the sensible retina,

[1] Middlemore's Treatise, vol. iii. p. 342, 343.
[2] Cyc. of Pract. Med. vol. i. p. 63.

either from the point of the instrument or the pressure of the hard lens, it is likely to be more or less accompanied by pain, and attended by a greater or less defect of vision, or even perfect amaurosis. I will not assert that this is absolutely diagnostic of the nature of the injury; but in those cases which have come under my observation, or in which I have been consulted, there could be little doubt of the fact of the defective sight and the constant pains having originated from pressure on or laceration of the retina."[1]

Orbital tumours occasionally compress the retina by the pressure they exert on the eye-ball, independently of the elongation, and sometimes compression of the optic nerve. In fact the retina may be compressed in numerous ways; for instance, by sub-sclerotic or sub-choroid dropsy, by general hydrophthalmia or by dropsy only of the vitreous humour, aneurism or simple enlargement of the ramus centralis retinæ, or of the other retinal vessels, enlargement of the choroidal vessels, the pressure of any foreign body, by effusion of blood in or upon its surface, and by deposition of lymph.

In sub-sclerotic dropsy the serous collection depends on inflammatory action of the internal tunics of the eye, which may be either acute or chronic: the collection taking place in one instance, with great rapidity, and producing severe symptoms, whilst in other cases it accumulates very slowly, and without much pain. Sub-sclerotic dropsy produces somewhat similar symptoms, and is relieved by similar treatment as sub-choroid dropsy.

Sub-choroid dropsy.—Serous collections, as the consequences of inflammation, occur either between the laminæ of the choroid, or between the choroid and retina. Sub-choroid dropsy most frequently depends on either acute or chronic choroiditis, but "which," says Dr. Mackenzie, "appears also to originate sometimes in arthritic ophthalmia." (p. 630.)

Symptoms.—It will be difficult to distinguish this disease in the living body, says Mr. Wardrop, by any symptoms or appearances of the eye, as these much resemble some other affections of the posterior chamber, and as there is no change in the form of the eye-ball. When the accumulation of water has taken place slowly, the loss of vision has been gradual, and the accompanying pain and redness have not been great. In other cases, the water collects quickly, and is accompanied with great pain, particularly in the head; the pupil becomes much dilated; and, when the disease is far advanced, there is an appearance of an opaque body behind the lens, from the retina being compressed, which, in one instance, was mistaken for cataract, and an attempt made to couch it.—(vol. ii. p. 71, 72.) He gives a vertical section of an eye, "where a watery fluid had collected between the choroid coat and retina, in such quantity, as to compress the retina into a chord, and produce a complete absorption of the vitreous humour."—(Plate xvii. p. 289.) The eye, in this instance, appeared, on a superficial examination,

[1] Guthrie's Operative Surgery of the Eye, edit. 3, p. 310, 311.

to be affected with cataract, a white substance being seen behind the pupil. An attempt was made to couch what was conceived to be the opaque lens—a fruitless operation, which gave great pain. The advancing retina, in this disease, somewhat resembles, and has been mistaken for fungus hæmatodes, being forced forwards in the form of a cone, its apex being at the optic nerve, whilst its base surrounds the edge of the crystalline lens.

Numerous cases are on record of amaurosis and absorption of the vitreous humour, which were produced by sub-choroid dropsy. Mr. Ware describes a case of this disease, where he found, on dissection, "a considerable quantity of a yellow-coloured fluid, as thin as water, accumulated between the choroid coat and retina; the retina itself being collapsed, and resembling a cone of a white colour, the apex of which was at the entrance of the optic nerve, and the base surrounded the crystalline humour, the vitreous humour being absorbed."[1]

Mr. Wardrop has had an opportunity of dissecting several eyes affected with disease. The serous collection, in these cases, had displaced and compressed the vitreous humour and retina. The vitreous humour was more or less completely absorbed, and the retina shriveled up, and formed into a bundle of white matter, which extended through the centre of the eye ball, from the entrance of the optic nerve to the posterior part of the crystalline capsulæ; the choroid tunic being unchanged. (p. 70.) Cases of this affection are described by Verle, Zinn, and Scarpa.

Treatment.—A fine grooved needle should be passed through the sclerotic and choroid coats, in the usual place of passing the cataract needle, directed backwards and inwards, towards the centre of the vitreous humour, taking especial care to avoid the crystalline lens. Mr. Ware advises us to employ this operation in suspected cases, and he prefers a grooved needle, from its facilitating the escape of the serous fluid.

Dropsy of the vitreous humour.—The pressure produced by dropsy of the vitreous humour forces the cornea forwards, and, from the bulging of the sclerotica, in the intervals between the recti muscles, the eye acquires nearly a square form; the lens is pushed forwards, and in advanced cases the iris is pressed in contact with the neural surface of the cornea, the aqueous humour is greatly diminished in quantity, the pupil is in a medium state between contraction and dilation, its motions sluggish, and eventually quite destroyed; the iris of its natural colour and appearance; the sclerotica becomes much attenuated, from the distension, and of a dark blue colour, from the vessels of the choroid being apparent through it, but especially so around the corneal margin.

The eye is evidently enlarged from the commencement; and at length so much so, as to be scarcely contained in the orbit, or covered by the eye-lids. The eye is moved with great difficulty,

[1] Surgical Observations on the Eye, vol. i. p. 510.

which increases in proportion to the enlargement. The globe is extremely hard and resisting, which increases until there is great danger of the tunics bursting, unless the tension be relieved by operation.

Vision, in the first place, is defective, and the patient myopic; but at length complete amaurosis is induced, the sensibility of the retina being entirely abolished.

During the early progress of this disease the patient complains of a deep-seated feeling of pain and tension, but as the vitreous humour increases in quantity the pain and tension become violent and maddening, and extend to the head and face; occasionally so severe is the pain, that Beer knew a man who punctured the globe with his pen-knife, "in the intensity of his agony."

Treatment.—The general health should be improved by all possible means, efficient counter-irritation used in the neighbourhood, and these means failing, we should have recourse to paracentesis oculi as frequently as the accumulation should require. Beer has proposed to make a section of the cornea, as for extraction of the cataract, and through it to evacuate the lens, and the whole or chief part of the vitreous humour, so as to produce collapse and shrinking of the tunics, and, of course, perfect loss of the eye.

Case 1.—"A gentleman," says Mr. Middlemore, "complained of great pain in the globe, with a sense of tension, and great dimness of vision, occurring, as he stated, without any cause, with which he was acquainted. On examining the eye, the iris was found to be somewhat convex, the pupil slightly dilated and sluggish in its motions, and it had also a very dull and cloudy appearance; the globe of the eye was exceedingly firm and hard. Acute inflammation of the hyaloid membrane was suspected, and therefore bleeding, the use of mercury, and the application of blisters to the nape of the neck were forthwith suggested and employed, but without any apparently beneficial effect: for the eye-ball increased in firmness, and became evidently enlarged; the pupil became contracted and immoveable, the iris was almost in contact with the cornea, the lens was becoming opaque, and vision was nearly destroyed. The pain in the eye, the orbit, and the head, were almost insupportable. The eye was now tapped, with a fine grooved needle, leeches were applied to the temples, and mercurial ointment, blended with opium, was rubbed over and around the situation of the supra-orbitary nerve. After repeated tapping of the eye, the disease terminated in collapse of the eye-ball; and it is extremely probable, from the state of the patient's vision, that the retina was first compressed, and eventually absorbed, together with the hyaloid membrane, and its septa.

"At all events where great dimness of vision occurs in connection with an increase of the vitreous fluid, and independently of any proper and sufficient indication of inflammation, either of the choroid or of the retina, there is satisfactory evidence that such dimness of vision arises chiefly from compression of the retina;

and if it continue, on the removal of the compressing cause, there is very good reason to believe that the compression it has already sustained has either induced an immediate state of atony, or has caused its partial or total absorption."[1]

Sect. V.—*Amaurosis from Injury of the Retina.*

Blows on the eye not unfrequently produce amaurosis, although no visible injury may have been received; the texture of the retina being doubtless lacerated, or compressed by effusion of blood between its laminæ, &c.

Symptoms.—When amaurosis is the result of injuries of the eye, the loss or diminution of vision is usually sudden; the pupil is dilated and the iris motionless. If the lens has been injured, cataract will at the same time be induced, and in all cases of cataract following injuries of the eye, it would be advisable to ascertain with certainty that amaurosis was not co-existing at the same time, before the practitioner adopted any steps as regards its removal.

Mr. Tyrrell remarks, "when the eye is unprepared for violence, a very slight blow will destroy the functions of the retina, but if the violence be expected, it will sustain a violent concussion without serious injury." The following is a most remarkable case of amaurosis of this kind:

Case 1.—"A young man was amusing himself by looking at some gentlemen who were shooting at pigeons from a trap, and was situated at a distance of about two hundred yards from the shooter. Immediately after a shot he was sensible of a slight blow on the outer part of one eye, which produced a slight stinging pain of momentary duration only; some confusion in vision induced him to examine the state of both eyes, and he found that he could not even perceive light with that which had been struck. On the following day he applied at the infirmary, when I found the pupil dilated, the iris motionless, and a small ecchymose spot, about the size of a large pin's head, between the outer margin of the cornea and the external canthus; there was not any lesion of the conjunctiva or sclerotica, but merely a slight extravasation between the two; vision was completely destroyed, and he remained amaurotic, in spite of all treatment, which was carefully pursued for many weeks."[2]

Injuries of the retina may occur from couching. Daviel, in his post mortem examinations, "found the crystalline lodged between the retina and choroides, and these two membranes torn in several places," (in amaurosis following couching.) "Amaurosis," observes Mr. Guthrie, "may occur without any vomiting, and with little

[1] Middlemore's Treatise, vol. ii. p. 327, 328.
[2] Cyc. of Pract. Surg. pt. i. p. 79.

pain; in these cases the retina has been injured; the eye diminishes in size from the secretion of the humours being imperfect, a slight blush of inflammation is observable on the sclerotica for a considerable time; the pupil begins to diminish from low inflammation: it appears cloudy, as if a thin network were drawn behind it, which gradually becomes more opaque; the cornea shrinks and flattens with the general diminution of the eye; the iris, for the most part, becomes corrugated, convex, immoveable, and insensible to any degree of light; or if it be moveable, it is merely a vibratory motion, dependent on disorganisation of the vitreous humour, where the pupil has not closed."[1]

Slight wounds of the retina, as simple puncture, are unattended with any injury to vision, or even sensation; such wounds are not unfrequently inflicted in operations for cataract without any bad effects. M. Magendie has pushed the opaque lens against the optic nerve in the operation of depression, and has repeatedly touched, and even punctured it with his cataract needle, without producing either pain or even sensation to the patient; nor were these injuries followed by inflammation, or any amaurotic symptoms. Extensive wounds or lacerations invariably produce amaurosis.

Concussion of the retina may be produced with other injuries of the eye-ball, the sclerotica or cornea may be ruptured, the lens dislocated, the iris torn or detached, and the pupil irregular. When no visible injury has been inflicted, it is impossible to ascertain the nature of the mischief that has been done to the retina; it may be detached from its connections, blood may be effused into its substance or upon its surface, the structure of the retina itself may be lacerated or injured, and inflammation induced. "The concussion of the organ, and the lesion of the sensibility of the retina and optic nerve, may, in some of the cases, particularly when the consequent amaurosis is merely temporary, constitute the principal or only change."[2]

Pressure on the retina alone, if violent, may be sufficient to produce amaurosis, as in the following case from Beer.

Case 2.—"Some years ago," observes Beer, "I was called to a man who had previously enjoyed excellent sight, but, a short time before I saw him, had in an instant become totally blind in both eyes. He happened to be in a company of friends, when suddenly a stranger stepped behind him, and clapped his hands upon his eyes, desiring him to tell who stood behind him. Unable or unwilling to answer this question, he endeavoured to remove the hands of the other person, who only pressed them the firmer on the eyes, till at length withdrawing them so as to allow the eyes to be opened, the man found that he saw nothing, and continued ever afterwards blind, without any apparent lesion of the eyes."

I have already remarked that slight injuries of the eye, when the

[1] Guthrie's Operative Surgery of the Eye, edit. 3, p. 313.
[2] Copland's Med. Dict., pt. i. art. Amaurosis, p. 55.

retina is unprepared, not unfrequently produce amaurosis. "This concussion," says Mr. Lawrence, "of the retina, and consequent blindness, sometimes take place from accidents, that we should hardly deem adequate to produce such an effect. I was consulted in the case of a young gentleman in the country, who had merely struck the eye with a pocket knife, when cutting a piece of whip-cord; the blade of the knife, which was quite blunt, wounded the lower part of the cornea. The lad was treated very judiciously; the practitioner on the spot applied leeches, and did all that could be done in such a case; but when the eye was opened, after a certain time, the friends were alarmed to find that the patient could not see; and he was consequently brought to town. The pupil was dilated and fixed, but not discoloured. The wound seemed to have penetrated the cornea and reached the iris, which adhered to the cicatrix, but it had not extended to the lens; the eye, however, was quite insensible to light. I considered the eye to be lost, and indeed it did not appear to me that any thing could be done. As the parents of the child were very anxious about him, a consultation was held on the case, which terminated in the same opinion. After three or four months, he was brought again to town, when the process of absorption had not only begun, but considerably advanced, so that the bulk of the globe was already considerably reduced." (p. 146.)

From whatever cause the power of the retina is completely annihilated, it produces atrophy of the nervous matter of the optic nerve, and eventually of the retina. After some years' duration of the amaurosis, little more than neurilema will be found, in the whole extent of the optic nerve, from the sclerotica to the commissure, although originally the retina was affected only functionally. In some cases this atrophic alteration extends beyond the commissure.

Prognosis.—If complete blindness be the immediate result of the injury, our prognosis must be extremely unfavourable; but should the other tunics of the eye have been injured, blood effused, the pupil dilated and irregular, and the retina evidently lacerated at the same time, there is scarcely any prospect of success. Under any circumstances, however, even should some degree of vision remain, our prognosis should be cautious, because we are unable to ascertain the extent or kind of injury.

Should vision begin to improve some hours, or even days after the occurrence of the accident, which, in these cases, frequently happens, we may anticipate further improvement. Even where the amendment of vision is still slower, but progressive, we may confidently expect considerable improvement, which happily, in many cases, terminates in perfect recovery. But where, in the commencement, almost complete amaurosis resulted from the injury, although we may have successfully combated the inflammation resulting, yet, if the sight be not improved after some weeks, but little chance of amendment remains under any treatment.

Treatment.—Our first care, in the management of these cases of amaurosis, is to guard against inflammation, and if suchis induced, to meet it early and actively. Our treatment should be strictly antiphlogistic, perfect rest of the organ, cold applications, local abstraction of blood by leeches or cupping, mercury, (if inflammation is induced,) purgatives, and abstemious diet, are indicated, and should be commenced as quickly as possible after the receipt of the injury; "for," remarks Mr. Mackenzie, "much may be done for their relief, if they be taken in proper time." Should the amaurotic symptoms continue after all dread of inflammation is passed, we may endeavor to rouse its sensibility by impressions acting through the medium of the nervus trigeminus.

Counter-irritation by blisters, setons, or the tartar emetic eruption, the endermic application of that potent remedy strychnine, electricity, pungent vapours applied to the conjunctiva, and where the conjunctiva and schneiderian membrane are unnaturally dry, sternutatories are applicable, as in fact they are in all cases of amaurosis depending on atony of the nervous textures, of paralysis, not complicated with inflammation or active hyperæmia. Should inflammation, change of structure, or any other pathological change be the result of injury, "the treatment must be directed according to the particular lesion, functional or organic, that may have been primarily or consecutively produced."[1]

Sect. VI.—*Amaurosis from Organic Diseases of the Retina.*

It seems probable that fungus hæmatodes originates in the nervous structure of the retina or optic nerve, and, according to Mr. Middlemore, its origin is pedicular.

Symptoms.—Amaurosis is amongst the first symptoms of this formidable disease; and on examining the eye a brilliant metallic appearance is discoverable, usually of a yellow colour, which is situated at the very bottom of the eye; slight vascularity of the conjunctiva, or sclerotica, tension and pain of the eye are present, and irritability of the system. As the disease proceeds the eye becomes filled with the fungous mass, the pupil is dilated and motionless, the iris pushed towards the cornea, the lens and aqueous humour become opaque, and the textures of the posterior chamber involved in the diseased mass. At length the fungus reaches the cornea, which becomes opaque, distended, and ultimately sloughs or ulcerates. As soon as the fungus protrudes, the pain and distension of the globe are greatly mitigated, and the constitutional irritability, for the time, removed. The fungus increases rapidly, wears down the powers of the patient, by the discharge from its surface, the constitutional irritation, and the frequent hemorrhage from its surface on the slightest injury, and the constant process of

[1] Copland's Med. Dict. p. 61.

sloughing or ulceration. Spontaneous recoveries, or even benefit obtained by extirpation of the eye-ball, are extremely rare, the disease, in the last case, returning either in the orbit, or in some other part of the body.

Fungus hæmatodes, in its earlier stages, has been mistaken for cataract. Mr. De la Garde observes, "although, perhaps, incorrectly placed in this chapter, since cataract is not combined with it, yet I could discover no better opportunity of mentioning the possibility of mistaking an early stage of medullary sarcoma. Of this disease I have seen several cases, prior to its extending beyond the vitreous portion of the cavity. It exhibited the general hue of mother of pearl, and would not have deceived those accustomed to inspect cataractous affections. Being, however, shown a case, which had arrived at the fungated stage, by a physician, he informed me, that when he first saw the patient, he thought the disease was cataract, and had advised a young surgeon in the neighbourhood to remove it. Fortunately the surgeon hesitated, not choosing, I believe, to undertake an operation of that description. His account of its appearance precisely agreed with what I had before observed."[1]

Melanosis of the eye-ball is a disease in which a soft black adventitious mass is formed in some of the deeper textures of the globe, which it distends and enlarges, at length arriving at the surface, by causing ulceration or absorption of the tunics, it presents a black fungous mass, which bleeds, sloughs, and ulcerates.

Symptoms.—The symptoms nearly resemble those of fungus hæmatodes, except that a dark slate-coloured, or black body is seen situated deeply in the eye-ball, instead of the brilliant metallic appearance.

Ossification of the Retina and of the Choroid.—Numerous instances are on record of ossification of the retina; it is, however, probable that the medullary, or nervous layer of the retina is never ossified, but either the vascular membrane of that tunic, or the membrana Jacobi, or only the cellular layer between the choroid and retina. Dr. Mackenzie observes, that "the proper retina, however, by which I understand the medullary and vasculo-cellular layers of that membrane, are rarely, if ever, affected in this way, but are generally found entire within the ossified cup. Whether the calcareous matter is deposited in a false membrane, in the membrane of Jacob, or in that of the pigment, remains doubtful. In a recent eye, when the membrane of Jacob is removed, a mucus-like layer may be peeled off the surface of the retina. Perhaps this may sometimes be the seat of the osseous deposite."—(p. 614.)

Mr. Wardrop speaks of ossification of the choroid. "I have met," he observes, "with a few instances where a thin cup of bone was found between the sclerotic coat and retina. In all these cases the ossifications were exactly similar. At the bottom of the cup

[1] De la Garde's Treatise on Cataract, p. 34.

there was a small round perforation, through which the retina passed to expand on the interior surface of the osseous shell. The retina was in immediate contact with the interior surface of the bone, but between the sclerotic coat and ossification there was a very thin, tender, and pale-coloured membranous expansion, the only vestige of the choroid coat. Bichat relates two instances, and similar cases are also mentioned by Haller, Morgagni, Walter, Pellier, Morand, Scarpa, and Günz." (vol. ii. p. 74.)

Sect. VII.—*Amaurosis from Atony of the Retina.*

Amaurosis from simple loss of nervous power of the retina, is by no means an unfrequent form of the disease. It occurs chiefly in delicate hysterical females, or in males of nervous temperament, and feeble constitutional powers, who employ—strain—their eyes all day and the greater part frequently of the night, on minute, polished, or brilliantly illuminated objects. The individuals who are affected by "weakness of vision," are generally but ill protected from the influence of superior light, the superciliary ridges of the frontal bone are flat and undeveloped, the eyebrows deficient, and the eyes projecting. In any individual, amaurosis of this description may be induced in a moment by a vivid flash of lightning, or any other brilliant and powerful stimulus, which paralyses the retina. Patients with an atonic condition of the retina not unfrequently apply, complaining of a gradual but progressive failure of vision, which they have endeavoured to remedy by the use of convex glasses, stating that they have gradually increased the convexity of the lens to compensate for the increased insensibility of the retina.

Patients of this class see best in a strong light, and therefore court bright sunshine, &c., and in some patients, so strong is the desire for light, that it has been called "a thirst for light." During the early stage of atony of the retina, the vision is uninjured, and objects, even if very minute, appear distinct and perfect when first the eyes are used, but shortly, after slight exercise, bodies seem to be enveloped in mist, and confused or distorted—in popular language "seem to run together;" a sense of weariness and aching comes on in the eye, with a painful and distressing feeling in the brow, the lid drops, and the patient is quite unable to pursue his accustomed employments. The painful symptoms become daily augmented, vision is imperfect and confused at all times, and complete amaurosis is induced by the slightest straining of the sight; but even at this stage vision is much more perfect in a bright light; he sees distant and large objects when brilliantly illuminated, nor is any pain induced by passive vision.

The amaurotic symptoms may continue for a great length of time, many months and even years, and yet, under persevering and judicious treatment, and a careful avoidance of all exciting causes,

or in some instances spontaneously, when the eyes are perfectly rested, and the general health improved, eventually, and perhaps perfectly, regain healthy vision.

On examining the eyes of a patient amaurotic from an atonic state of the retinæ, they appear perfectly natural in the commencement of the disease; when, however, the retina becomes more and more insensible, the pupil dilates and becomes less and less active in its movements, but the eye is quite free from organic changes, the iris retains its brilliant and radiated appearance and natural colour, the conjunctiva is rarely more vascular than natural, sometimes, on the contrary, it is unusually pale and bloodless, the humours are perfectly clear and diaphanous, and the eye retains its natural degree of solidity. In fact it constitutes that form of amaurosis "the characteristic symptoms of which," says Beer, "consists peculiarly and entirely in an impairment or loss of vision without any morbid change in the organic matter of the eye."

The pathological condition of the retina,—its proximate cause, is doubtless a condition of the retina similar to that failure of function of other parts which results from excessive employment.

Treatment.—This form of amaurosis is not benefited by active antiphlogistic remedies, or mercury carried to salivation, which is adapted to the inflammatory varieties. The principal indication of cure by general treatment is to give tone to the system, and in particular to the nervous system: mercury may be given as a tonic in alterative doses; the eyes should be exercised only on large or distant objects; the patient should abandon all straining of the eyes, or exercise on minute objects; the bowels may be kept lax by aperient medicine, combined, according to circumstances, with tonics, antispasmodics, or cordials; the digestive organs must be kept in good order by mild, regular, and nutritious food, plenty of exercise in the open air, the country especially, and if necessary, the bitter infusions; lastly, we should seek for, and if possible remove any uterine source of irritation.

Local treatment.—Nothing is more likely to prove serviceable than some efficient mode of counter-irritation, as blisters to the temples or behind the ears, allowed to heal, and then reapplied, or a permanent discharge, by a seton or the ointment of the potassio tartrate of antimony, at the back of the neck. Stimulating applications may likewise be applied to the surface of the conjunctiva, as the vapour of ammonia or ether, or some mild collyrium, as the dilute vinum opii, and the eyes may be bathed night and morning with cold spring water. No form of amaurosis is so likely to be benefited by the application of strychnia, or, other things failing, by electricity or galvanism, as the atonic.

The following case illustrates the mild form of this disease—weakness of vision.

Case 1.—Joseph Staddon, a shoemaker, twenty-one years of age, of a pale complexion and unhealthy appearance, applied at the West of England Eye Infirmary, on the 2d of March 1837.

He complained of great obscurity of vision on attempting to pursue his usual employments: when he first regarded objects they appeared plain and perfect, but on attentively eyeing his work, or any other minute object, for a short time, it became confused, distorted, and enveloped in mist; the eye and brow ached, and he was obliged to desist. The eyes appeared in all respects perfectly natural. He was directed to take a pill of five grains of the compound extract of colocynth every night, to bathe the eyes frequently with a solution of the sulphate of zinc, and to avoid straining the eyes by any work which required much attention. He rapidly recovered perfect vision under this treatment, and soon after was discharged cured.

CHAPTER IV.

Amaurosis from Affections of the Optic Nerve.

SECT. I.—*Optic Neuritis.*

Acute inflammation of the optic nerve, or of its neurilema, no doubt, occasionally occurs in severe cases of phlegmonous inflammation and suppuration of the orbital cellular membrane, although we are quite ignorant of the peculiar symptoms which would result from inflammation of this nerve.

"When," says Mr. Lawrence, "we consider the vascular and *nervous* structures which compose the contents of the orbit, their close contiguity with the sensorium; further, the direct membranous continuation between the periorbita and the fibrous sheath of the optic nerve on one side, and the dura mater lining the cavity of the cranium on the other, we shall not be surprised to find that inflammation of the orbital contents is characterised by the most violent and agonising pain deeply seated in the orbit, extending over the whole of the head, and accompanied by a sensation of tension and bursting, as if the contained parts were too large for the cavity in which they are lodged."

Chronic inflammation of the optic nerve or its neurilema, is occasionally the cause of amaurosis. Suppuration of this nerve has likewise been noticed, and I have previously quoted a case of this description from Drs. Townsend's and West's translation of Andral's Pathological Anatomy, vol. ii. p. 800.

Dr. Copland gives the following symptoms as indicative of "amaurosis from disease of the optic nerves, or of their sheaths." "This species of amaurosis always advances slowly, generally commencing in one eye, with a black cloud, which grows more and more dense, great disfigurement and perversion of objects,

without pain of the head or eye. There is, however, a sensation of pressure at the bottom of the eye, as if forcing the eye-ball from its socket. The pupil is generally, from the commencement, much dilated, and angular from irregular action of the iris. By degrees, according to Beer, glaucomatous change of the vitreous humour supervenes, and afterwards of the lens itself, but without any varicose affection of the vessels of the eye. At last the eye-ball becomes somewhat smaller than natural, but complete atrophy does not ensue."[1]

Sect. II.—*Amaurosis from Injuries of the Optic Nerve.*

Penetrating wounds of the orbit may complicate the optic nerve, and thus give rise to one form of amaurosis, or they may induce severe inflammation, or even death. Exophthalmos may arise from blows or from penetrating wounds of the orbit, and amaurosis may be the consequence of the stretching of the optic nerve, or the pressure of the retained foreign body.

Dr. Mackenzie gives the following case, taken from a letter to Horstius.

Case 1.—" A boy of 14 years of age was struck by an arrow, while amusing himself in his play-ground. It stuck fast in the orbit, but the boy pulled it out, and threw it on the ground. A surgeon arrived, to whom the play-fellows of the boy who was wounded showed the arrow, deprived of its iron point. With a probe the surgeon attempted to examine the wound; but, on the boy fainting, he desisted, so that the iron point was left in the orbit. The external wound healed, and the boy recovered; the eye remained clear and moveable, but deprived of sight. This happened in the beginning of August, 1594, and nothing more was heard of the iron point, till October, 1624; when, after an attack of fever and catarrh, with a great deal of sneezing, it descended into the left nostril, whence, taking the way of the fauces, it came into the mouth and was discharged. During the whole thirty years and three months that it had remained in the head, it had not been productive of any pain." (Loc. cit. p. 17.)

Mr. Guthrie observes that " inflammation and suppuration within the orbit are sometimes followed by much more serious consequences, implicating the eye-ball, and even the life of the patient. I once saw a case of this kind in a soldier, who was wounded at the battle of Albuhera, by a bayonet, which penetrated into the orbit without injuring the eye. The symptoms which ensued were trifling, until the patient contrived, three days afterwards, to absent himself for twenty-four hours and get drunk. On his return, the eye-ball was protruded, the lid could not be raised so as to expose the eye, which was highly inflamed; chemosis had taken place,

[1] Copland's Medical Dictionary, pt. i. p. 56.

vision was indistinct, the iris was discoloured, the pupil contracted, the pain was excruciating, both in the eye, which felt as if it were too large for the orbit, and all over the forehead and temple of that side; flashes of light, of various colours, darted through the eye, in consequence of the surrounding pressure upon it; the swelling increased, the patient became delirious; and an abscess burst in the upper eye-lid on the fourth day, without any alleviation of the symptoms. He soon afterwards became comatose, and died, I have little doubt, from the formation of matter within the head. The eye had previously been lost by the sloughing of the cornea. In some cases, this fatal termination is said to take place in a different manner, by the destruction of the bones of the orbit, and consequent communication with the cavity of the skull; but this I have never seen." (Loc. cit. p. 158.)

Mr. Bell has given the following remarkable case of exophthalmos, with perfect restoration of vision from the return of the eye to its natural situation.

"Several years ago I met with an instance of this, in which the eye was almost entirely turned out of the socket by a sharp-pointed piece of iron pushed in beneath it. The iron passed through a portion of the socket, and remained very firmly fixed for the space of a quarter of an hour; during which period the patient suffered exquisite pain; he was quite blind in the affected eye; and the eye-ball being pushed so far out as to give reason to suspect that the optic nerve was ruptured, it was doubted whether it would answer any purpose to replace it or not. As no harm, however, could arise from a trial being made of it, I resolved to make the attempt; and with much pleasure and astonishment I found, on removing the wedge of iron, which being driven to the head was done with difficulty, that the power of vision instantly returned even before the eye was replaced. The eye was now put easily into the socket; and the effects of inflammation being guarded against, the patient enjoyed very perfect vision." [1]

Treatment.—Wounds of the orbit are to be conducted on common surgical principles, the foreign body, if still retained in the orbit, should be removed, and the eye-ball replaced in its normal situation; should it be impossible to effect this by other means, the aperture of the eye-lids may be enlarged by dividing the temporal angle to a sufficient extent. The most vigorous measures should be used to combat inflammation should it arise, and great precaution used to prevent it if possible at all originating.

[1] Bell's System of Surgery, vol. iv. p. 162. Edinburgh, 1801.

Sect. III.—*Amaurosis from Organic Changes, and Diseases of the Optic Nerve.*

Organic diseases of the optic nerve, originating in the textures of the nerve itself, are by no means common. "If," observes Mr. Tyrrell, "we could distinguish accurately the symptoms which attend the commencement of the morbid action, which leads to organic change in the texture of the optic nerve, we might adopt some decided plan of treatment; but I do not know of any means of effecting this; and when the change has taken place, either from morbid action, or from organic lesion, the amaurosis cannot be benefited by medical or surgical skill."[1]

Fungus hæmatodes occasionally commences in the optic nerve, but it is much more usual for the disease to originate in the retina, or sometimes in the orbital cellular membrane, and by extending, to contaminate the optic nerve. The nerve, when affected with fungus hæmatodes, is changed into the same medullary fungus as the adventitious matter which constitutes the disease; "and," says Mr. Wardrop, "these changes are usually to be observed in the medullary portion of the nerve."

The optic nerves, as the results of inflammation, have been found indurated, thickened, ulcerated, softened, and their medullary structure in a state of suppuration.

I have already mentioned the various formations in, and the diseases of the substance of the optic nerves, or their neurilema, which occasionally produce amaurosis. The adventitious formations are either calculous or bony, tubercular, albuminous, serous, or cysts, hydatids, and tumours of various descriptions. The optic nerves have been found atrophied, contorted, discoloured, softened, and the nervous matter entirely absorbed.

Beer describes the symptoms which arise from organic disease of the optic nerve, in the following words. He says, "it is developed slowly, commonly in one eye only, seldom in both. A black cloud appears before the eye, and becomes gradually thicker, while the patient experiences an annoying distortion of objects, without the smallest uneasy sensation in the eye or head; he only feels a slight sensation of pressure in the back of the orbit, as if the globe were pushed out of the socket; of which, however, there is no appearance. In the very beginning of the affection, the pupil is considerably dilated, and the pupillary margin of the perfectly-motionless iris is angular at various points; so that the pupil often presents an irregular pentagon or hexagon. Gradually, but very slowly, a glaucomatous degeneration of the vitreous humour, and even of the lens occurs, forming the only kind of glaucoma that I have hitherto seen, without any varicose affection of the blood-

[1] (Loc. cit. p. 92.)

vessels of the globe. At last the eye is visibly lessened; but complete atrophy does not take place."[1]

Case 1.—*Amaurosis with atrophy of the optic nerve.*—"A middle-aged man, of meagre habit, and very deeply scarred with smallpox, was admitted in the summer of 1829 into the surgical department of the infirmary, on account of chancres and bubo. The chancres soon healed; but the sore left in the groin, after the suppuration and opening of the bubo, was intractable. While in this state, he was attacked with dysentery, which at that time (Autumn 1829) prevailed in the hospital, and was so fatal, that about a fourth of those who were taken ill, perished. Being transferred to the medical department, on account of the dysenteric attack, he became my patient (Mr. Middlemore's.) At this time he had dysentery in its worst form; and although the acute stage was soon subdued, the symptoms, nevertheless, showed that extensive ulceration had taken place in the intestines; and he died six weeks after I saw him. At first no attention was paid to the circumstance of his being blind of an eye, as the marks of severe confluent smallpox seemed to account for it sufficiently. But on his mentioning to me incidentally, that the sight was lost only two years before, careful inquiry was made; and it was then learnt that, on the occasion alluded to, he had been a patient in St. Bartholomew's Hospital, London, with severe headach, giddiness, feverishness, and incomplete palsy of one of his sides; and that he gradually got the better of these symptoms, but was at the same time attacked with inflammation of the left eye, which burst, and became totally blind. It was natural in these circumstances to expect that some injury would be found in the course of the fifth nerve. This nerve, however, was found quite healthy, so far as the sight and touch could determine. But the optic nerve of the affected side between its exit through the orbit, and its decussation with the opposite nerve, was not more than half the breadth of the other, and was gray in colour, and flaccid in texture. Between the point of decussation, and the thalamus of the opposite side, it was of the natural whiteness, softer and less than its fellow; and the thalamus itself was somewhat flattened. The brain was otherwise healthy, except that a very great watery effusion had taken place under the arachnoid coat over the whole external surface, which appeared to account for the severe headach and frequent incoherence, remarked towards the end of his illness. There was no appearance of an old cyst, or other disorder, in the substance of the brain. The colon was covered to an enormous extent with ulcers, in various stages of progress. The left eye was completely disorganised."[2]

Case 2.—"Mrs. , aged eighty-three, had been completely blind from amaurosis, for thirty years before her decease in 1817. She had also been subject to irregular gout, which assumed a

[1] Lehre, vol. ii. p. 578.
[2] Middlemore's Treatise, vol. ii. p. 322, 323, 324.

variety of forms; and seven months before her death, she was attacked with palsy of one side. On opening the head, aqueous effusion was found below the tunica arachnoidea, and in both ventricles. One part of the cerebrum was observed to be of a pulpy texture; but these appearances were most probably connected with the recent paralytic attack, and not at all with the amaurotic. All the nerves, with the exception of the optic, had the usual appearance. On examining the membranous sheaths of these nerves, it was ascertained that their medullary matter had been completely removed; and this change had taken place even nearer to the brain than where the nerves cross each other."[1]

Sect. IV.—*Amaurosis from Pressure on, and Irritation of the Optic Nerve.*

Orbital tumours operate generally in producing amaurosis by compressing, irritating, or elongating the optic nerve. The diseases of the orbit which occasionally produce blindness in all, or in one of these ways, are numerous and diversified; thus the orbital disease may be malignant, as fungus hæmatodes, melanosis, or scirrhus, or there may be only simple induration and hypertrophy of the orbital cellular substance, encysted and other tumours, aneurism, or aneurism by anastomosis, diseases of the bones and periorbita, as exostosis, syphilitic enlargement, hyperostosis, diseases of the lachrymal gland, cysts and hydatids in the orbit, inflammation and suppuration of the orbital cellular membrane, &c.

In describing fungus hæmatodes of the orbital cellular membrane, Mr. Travers observes, "an extraordinary globular tumour is formed around the ball, of which the perished cornea forms the centre. It projects, stretching and so separating the lids, that they girt tightly the base of the enormous swelling. I have seen several children subjects of this affection. The growth is sometimes confined to the upper or frontal aspect of the orbit. The upper lid is then prolonged and stretched over the globe so tightly that it is difficult, if practicable, to obtain a view of the latter. The medullary matter is of a granular or ricy consistence, and pervades and destroys the muscles, periosteum, and finally the bony vault of the orbit. I have seen its extirpation boldly performed; but its re-appearance has been almost immediate, and its progress quick to destruction."[2]

Mr. Liston observes, that "the majority of tumours in this situation are of rapid growth, their structure is soft and medullary, they sooner or later furnish a fungus, and though removed at an early period, are generally reproduced. The exophthalmos is often the

[1] Weller's Manual of the Diseases of the Human Eye, vol. ii. pp. 79, 80, note by Dr. Monteath.

[2] Medi-Chirurgical Transactions, vol. xv. p. 238.

first indication of such a growth, and it is sometimes greater in the early part of the disease than afterwards, when the fascia passing down from the edge of the orbit has given way. The malignant tumours are most frequently met with in childhood, though morbid growths of a bad kind form in the eye-ball at different periods of life."[1]

Case 1.—"A Hebrew girl, seven years old, struck the right side of the head against the ground in a fall, receiving no other injury than a slight graze of the skin, near the external angle of the eye. Three weeks after, a small swelling, not differing in colour from the rest of the skin, appeared on the middle of the right upper eye-lid. This increased rapidly, and soon became reddish, instead of white, which it had been originally. It was twice punctured without any other effect than the escape of some clear blood. When the patient entered the surgical clinic at Heidelberg, eighteen weeks after the fall, the swelling was as large as a goose egg, deep red, with a shining surface; which exhibited numerous vascular anastomoses. It was moveable and soft. It covered the eye completely, but there was no reason to suppose that the organ was involved, as the patient had been able to see a little, fifteen days before. The tumour was removed, together with the eye-ball, on the 13th of October, 1820. It was solid, of sarcomatous and medullary composition, in some parts even cartilaginous; it contained numerous vessels. In three weeks the cicatrization was nearly completed, but in the fourth week a small tumour showed itself near the internal angle of the eye, and increased so rapidly, that it was again removed on the 27th of December. It was now discovered that the tumour extended through the orbital parietes towards the nose. In a few days the growth re-appeared; but the termination of the disease was not known." (Lawrence's Treatise, p. 729.)[2]

Melanosis of the orbit may occur as a primary or secondary affection; like fungus hæmatodes, it is very prone to recur after a removal of the disease.

Case 2.—A fatal case of melanosis of the liver is recorded by Chomel, (Nouveau Journal de Médecine, tome iii. p. 41), in which the cellular membrane of the orbit was affected with the same disease. The right eye was inflamed, and projected remarkably from the orbit. An abscess occupied the lower third of the cornea, and the patient saw very obscurely with this eye, behind which there was found, on dissection, a round melanotic mass, about an inch in diameter. It seemed to be formed at the expense of the cellular membrane at the bottom of the orbit, and had displaced the optic nerve, without altering its texture.[3]

Tumours of various descriptions, encysted, sarcomatous, bony,

[1] Liston's Elements of Surgery, pt. ii. p. 146, 147.

[2] Dissertation sur le Fongus Médullaire de l'Œil; Thèse présentée à la Faculté de Médecine, &c. par F. Bauer, Paris, 4to. 1830, p. 41—44.

[3] See a case also in the Lancet, vol. ii. 1829—30. p. 188.

or steatomatous, hydatids, &c., occur in the orbit, and may give rise to protrusion of the eye, *exophthalmos*, compression, and irritation of the optic nerve. They occur at all ages, and their growth may be slow and without much pain, or very rapid and attended by great suffering.

Case 3.—"A man, aged 26, had laboured under blindness with exophthalmos for eighteen months. A tumour could be felt above the eye-ball, and I dissected it out, along with the lachrymal gland, to which it adhered. It was of a medullo-sarcomatous structure, and of the size of a plum; at one point it contained a mass of coagulated blood. After its removal, the eye resumed its place and functions. The patient remains well; but such favourable cases are rare."[1]

Cysts of the orbit containing liquid matter are not uncommon: a very interesting case of a double cyst extending to the bottom of the orbit, and containing a tooth, is related by Mr. Barnes, in the Medico-Chirurgical Transactions.

Case 4.—Thomas Heard, a healthy-looking lad of 17, was admitted as an in-patient of the West of England Eye Infirmary, under Mr. Barnes' care, on account of a tumour which entirely obstructed the sight of his left eye. The tumour occupied a very considerable portion of the orbit beneath the eye; the eye being in consequence pushed into the upper part of that cavity, so much so as to be in great measure hidden behind the upper lid. The tumour appeared to extend deeply on tracing it backwards, while it projected so considerably in front, as to constitute a striking deformity. In front it was rounded in form, and superficially divided by a groove, which ran obliquely across its upper surface, dividing the more prominent and moveable part of the swelling, and that more immediately under the eye-ball. The ciliary edge of the lower tarsus, with a few scattered hairs in it, crossed the front of the tumour, rather above its middle; the conjunctiva, drawn forwards from the eye-ball, greatly stretched, but not apparently much altered in structure, investing it above; and a thin skin of a deep red, loaded with purple vessels, covering it below; but neither of them closely adherent to it. The portion of the tumour in front was soft, and could be moulded into different shapes by the fingers; the posterior division felt more elastic. The patient could by an effort raise the upper eye-lid a little, but not sufficiently high to discover even the lower edge of the cornea. A portion of the pupil might be exposed by lifting the lid with the finger, and he could then imperfectly distinguish objects. The eye was apparently perfect, but he scarcely possessed any power of moving it. The swelling was first observed in early infancy, and was at that time not much larger than a pea. It increased but slowly, until about four or five years since, when it began evidently to enlarge, and for some time it grew rapidly. Latterly it had not advanced much. It caused

[1] Liston's Surgery, pt. ii. p. 148.

no pain, but as it was a great deformity, and still continued to increase, rendering by its presence the eye useless, it was thought advisable to remove it.

Operation.—In the operation the inferior oblique muscle was divided, which appeared stretched across the front of the tumour, having been pushed before it, in its progress from the deep parts of the orbit. The sac adhered firmly to the outer angle and part of the lower edge of the orbit; elsewhere it was but loosely connected with the surrounding parts. It was found to extend almost to the bottom of the orbit, and to occupy more of that cavity than did the eye itself. As it was impossible to proceed with the dissection deep in the cavity of the orbit, without greatly endangering the eye, from the very narrow space which was left between it and the posterior division of the swelling, the contents were partially evacuated with a puncture, in order to obtain room, and the cyst cautiously separated from its deeper attachments. Towards the posterior point, on the inner side, and about an inch from the edge of the orbit, the sac felt as if it embraced a sharp bony process, arising from about the line of junction between the ethmoid and superior maxillary bones. Mr. Barnes being unwilling to proceed at hazard, cut off the cyst close up to this point, in order to ascertain its nature and connections, before any attempt was made to remove it. It appeared to be formed of bone, which terminated in a sharp point, and projected almost perpendicularly into the cavity of the orbit. It was slightly moveable as if attached to the periorbita only. This body was removed without difficulty, together with the remains of the sac which adhered to it. On examination it was discovered to be a tooth, and resembled in form and size the supernumerary teeth occasionally found in the palate. That part of the tooth which projected into the sac was conical, and covered by smooth, shining, white enamel; the sac firmly adhered to a contracted part at the base of the cone, resembling the neck of a tooth; and external to the sac there was an appearance of a root, obliquely truncated, with a passage in the centre, evidently containing blood-vessels. The tooth was connected to the floor of the orbit by its root. The patient had a complete natural set of teeth, although many of them were disposed irregularly.

The tumour was found to consist of two cysts, which were separable by dissection to some depth all around, at the groove already mentioned, but indissolubly united in the centre. The cyst in front allowed the colour of its contents to be distinguished through it: but the posterior was thicker and more vascular. The interior surface of the front cyst was rough, with a little chalky matter here and there adhering to it. It contained a compact lardaceous, yellow substance. The inner surface of the posterior sac was smooth, excepting a part near the tooth, where it had much the appearance of coarse skin with many pores in it. The contents were partly a whey-coloured fluid, and partly a yellow curdy substance.

On the removal of the tumour, the eye did not in the least drop,

and the large cavity which this had occupied, was filled with pieces of soft sponge dipped in oil. When the last piece of sponge was removed, on the seventh day after the operation, the cavity was found to be everywhere covered with healthy granulations. The opening contracted rapidly, and the eye sunk fast, so that it was nearly on a level with the other by a fortnight. The patient was discharged with the wound perfectly healed in the beginning of January. The lower lid did not, at that time, cover so much of the eye-ball as it does naturally; and in one spot the ciliary edge was a little inverted. He had the power of moving it slightly, but he could not raise it high enough to bring it into accurate apposition with the upper. There was a considerable hollow above the eye-ball, and the eye was not accurately in a line with the other, but a little above it. The motions of the eye were very limited in every direction, and he was unable to move it at all downwards. With the exception of this inconvenience, he recovered perfect vision with the eye.[1]

Case 5.—"A shoemaker," says M. Richerand, "45 years of age, had the left eye nearly protruded from the orbit in consequence of the gradual formation of a tumour between the inside of the eye-ball and the bone. No inflammation took place, although the exophthalmia was attended by pain. The eye was not increased in size, though pushed outwards and *deprived of sight*. The patient having consented to an operation for the removal of the tumour, I divided the external commissure of the eye-lids, and cut through the conjunctiva at its angle of reflection from the eye-lids above and below the eye-ball; but being desirous of ascertaining the nature of the swelling previously to its removal, I plunged the point of the bistoury into it; this was immediately followed by the discharge of between two and three ounces of a fluid resembling the white of an egg. Satisfied that the ex-ophthalmia was caused by the pressure of this, which was proved to be an encysted tumour, the eye having been partially restored to its place on the diminution of the swelling from the excavation of its contents, I gave up the idea of extirpating it, and merely placed a compress and bandage upon it. The inflammation was considerable, but was mitigated by bleeding in the foot; the sac suppurated, and the patient was cured after the excision of some little excrescences, which formed on the conjunctiva connected with it."[2]

Dr. Hope removed a steatomatous tumour from the orbit in a girl of 18, which had been growing many years. The vision was imperfect, but not lost. The tumour was of a spherical shape, the size of a pidgeon's egg, smooth and even, and extended a considerable way back in the orbit. The eye was retained in its position, after the operation, by means of a compress and metallic bandage;

[1] Medico-Chirurgical Transactions, vol. iv. p. 316.
[2] Richerand, Nosographie Chirurgicale, tome ii. p. 126.

and by these means it gradually regained its natural position with complete restoration of vision.

The cellular membrane of the orbit is liable to a true scirrhous change, or it is simply hypertrophied and indurated; in some cases there is a morbid deposition of fat, with protrusion of the eye, or serous infiltration.

When the cellular membrane is converted into a scirrhous mass, it usually, after a time, implicates the eye-ball; nor is it, during the scirrhous state, often a painful disease; the globe is protruded; the optic nerve compressed; and the medullary structure absorbed, vision gradually failing, until it is completely lost. The commencement of these symptoms are usually ascribed to a blow, fall, &c.

Case 7.—"A man, aged thirty-six, was admitted into the Hôpital de la Charité, with the left eye in the state of exophthalmos. It projected half an inch beyond the edge of the orbit, and had completely lost the power of vision, without any change in its form or lustre. The disease had commenced two years before, but the sight of the eye, although constantly becoming weaker, had been totally extinguished only for two months. The patient saw quite well with the other eye.

"Professor Roux judged the extirpation of the eye indispensable, and found that the disease consisted principally in a scirrhous affection of the cellular and adipose tissue of the orbit. The sclerotica appeared somewhat thicker and harder, and the vitreous humour more fluid and in greater quantity than natural. The optic nerve had been deprived of its functions only by the compression which it had undergone in the orbit." [1]

Mr. Lawrence gives the following case of induration of the orbital cellular substance.

Case 8.—"A young man of thirty, previously healthy, came under my care at St. Bartholomew's Hospital, on the 4th of April, 1827. He had travelled from Brighton to London in an open cart, on one of the coldest days of the preceding January, and had suffered most severely. The left arm and leg were benumbed, so that he could not move them, and he did not recover the use of them for three or four days. He also experienced pain in the left eye; but in a fortnight the lids swelled and closed, with distracting pain in the eye, and side of the head. He was in constant agony night and day, and he got no rest until he was completely exhausted by suffering. Cupping on the temple, repeated leechings, shaving and blistering the head, gave only partial and temporary relief. When he came to the hospital, the eye-ball was pushed forwards and upwards, projecting, by comparison with the other, about three quarters of an inch. The upper lid was everted by a considerable swelling of the conjunctiva, which was red, and loaded with serous effusion. The globe was natural; the iris moved freely, but vision was so imperfect, that the largest letters could not be seen. Nothing

[1] Mackenzie's Treatise, p. 323.—Revue Médicale, tome iv. p. 398.

issued from a deep puncture, made on the supposition of matter having formed in the orbit; but at the end of three or four days pus was discharged copiously. The pain now ceased, the swelling of the lids and the protrusion of the globe lessened, and sight improved, so that the patient could read small print. After some time bare bone could be felt towards the bottom of the orbit, and matter was discharged from the left nostril; on holding the nose and expiring, air came freely through the puncture. This subsequently closed, when the pain and protrusion of the eye returned; the latter indeed became more considerable than before, and vision was lost. In August another free incision was made, with temporary relief, and air again passed through the puncture. The probe entered deeply, and discovered a large excavation below the eye.

"Severe pain about the orbit and side of the head continued; numbness of the cheek and jaw came on, with increased redness of the eye and lids, and great protrusion, these symptoms receiving only a temporary alleviation from local bleeding and narcotics. The protrusion of the globe was now more than an inch; the pupil largely dilated, the iris motionless, and vision lost, except the mere power of distinguishing light from darkness. In November, the conjunctiva of the globe, which had hitherto remained nearly natural, became of a deep red, while the cornea lost its transparency, and then sloughed, the humours escaping, and the iris protruding in an irregular dirty-looking mass. The inflammatory sloughing, and ulcerative process, by which the cornea had been destroyed, in this case, resembled what Magendie has described as the consequence of dividing the nerve of the fifth pair in animals; it was probably owing to an analogous cause, as the morbid growth which caused the protrusion, must certainly have compressed or otherwise injured the infra-orbital, and perhaps the ophthalmic branch of the nervus trigeminus. The evacuation and subsidence of the globe did not diminish the patient's sufferings, nor the external swelling, which, on the contrary, still increased. As the complaint had now been progressive for many months, in spite of active treatment, both local and general, and as the health, although in other respects good, was suffering under the constant severe pain, I proposed to remove the contents of the orbit, being persuaded that the operation afforded the only remaining chance of relief: the patient readily assented to the proposal, and the operation was performed on the 6th of December. The palpebræ were freely separated at their external commissure, and then turned aside, so as to expose fully the anterior aperture of the orbit, the entire contents of which were detached from the cavity, by dissecting close on the surface of the latter, first below, then above, and at the sides, until the posterior connection alone was left. The latter was then divided by a knife curved on its flat surface, the patient experiencing excruciating but momentary agony when the muscles and nerves were divided. The mass, which was hard, completely filled the orbit, so that the dissection was necessarily carried on close to the bone, and performed slowly.

As the ophthalmic artery bled profusely, a conical compress of lint was introduced into the cavity, and held for some time on the vessel. This was removed in the evening without renewal of hemorrhage. The divided commissure of the lids was united by two sutures, and the tumid upper eye-lid closed the front of the orbit. He took thirty drops of laudanum at night.—7th. He slept at intervals, and passed a comfortable night; bloody fluid had oozed between the lids, but there had been no actual bleeding. The palpebræ are swollen, and bright red; the face is flushed, and he has slight headach, thirst, and foul tongue. (Twelve leeches round the margin of the orbit; saturnine lotion; a dose of calomel and jalap.) The inflammatory and febrile symptoms had disappeared on the next day, and the pain of the brow, head, and cheek, which had distressed the patient for so many months, was almost gone. Recovery now proceeded rapidly and uninterruptedly; the surface of the orbit granulating, and producing a vascular substance, which filled up a large part of the cavity; rest and appetite returned, and the patient soon regained his flesh, strength, and good looks. He left the hospital perfectly well on the 28th of December. The right eye, which had been sympathetically affected before the operation, regained its full strength.

"The mass removed from the orbit consisted of the collapsed and shrunk eye-ball in front, with a hard and incompressible substance behind, extending to the point at which the nerves and vessels had been divided. The recti muscles, unaltered in colour or texture, covered this substance, the exterior of which had the usual appearance of the orbital fat, except that it was more dense. An incision was carried from before backwards, directly through the centre of the entire mass. An apparently recent coagulum of blood separated the sclerotica from the choroid coat, the latter, with the retina, being compressed by the coagulum into a thick cord, extending from the optic nerve to the iris. There was no trace of the humours. The sclerotica was unchanged: the morbid growth adhered to it closely behind, and the optic nerve proceeded through the centre of the mass. The latter was a dense compact structure of scirrhous firmness, resisting the edge of the knife; its exterior consisted of a light gray texture, very much like that of a scirrhous breast, while in the interior this was intermixed with a light yellow, yet firm substance, resembling what is seen in scrofulous diseases. I use the term 'scirrhous' merely to describe the sensible characters of the structure, and not to convey an opinion that it was of a carcinomatous nature. I did not entertain the slightest apprehension that disease would return; yet, on reviewing the history of the case, and comparing with its course the bulk and texture of the morbid growth, I could not doubt that the latter would have continued to enlarge, and the sufferings of the patient to increase, had the disease been left to itself." [1]

[1] Loc. cit. p. 677—680

In acute inflammation of the orbital cellular membrane, and the collection of matter which results, pressure is exerted on the optic nerve, independently of its participation in the inflammation. Inflammation of the orbital cellular membrane is characterised by violent pain in the bottom of the orbit and head, feeling of pressure on the globe, or as if its contents were too small for the cavity which contains them, protrusion of the eye, sensation of sparks, flashes of fire, and brilliant spectra, gradual failure, sometimes complete loss of vision. These symptoms increase rapidly in severity; the lids are swollen and inflamed, and in some cases the inflammation spreads to the eye-ball itself.

Constitutional symptoms.—Very acute inflammatory fever, headach, and sometimes delirium, attend the progress of the inflammatory symptoms.

When suppuration occurs, it is generally indicated by rigors,—the eye protrudes to a greater extent; in some cases there is even complete exophthalmos; the matter approaches the front of the orbit, and eventually points between one of the eye-lids and the edge of the orbit, or behind the conjunctiva; the pain and feeling of tension are increased to a maddening extent; there is generally delirium, and the sight is destroyed, except the mere power of distinguishing light from darkness.

Treatment.—In the first instance the most active and decided employment of antiphlogistic means are called for; but should the symptoms proceed to suppuration, the matter must be evacuated on the first appearance of fluctuation; and, indeed, when other symptoms are present indicating its collection, should fluctuation be doubtful or absent, a deep puncture is often proper to relieve the painful symptoms, and test the prusence of purulent fluid, situated deeply, perhaps, in the orbit.

Tumours form occasionally beneath the periosteum. "I have not," says Mr. Guthrie, "met with an instance in which a cure has been effected."

Exostoses sometimes acquire a considerable size, but they proceed slowly, and without much pain. Mr. Guthrie observes that "exostosis from the bones of the orbit, is very rare; I have seen only two instances of it, both from the frontal bone." (loc. cit. p. 164.) "Tumours of this nature generally form towards the anterior aperture of the orbit, and are distinguished by the slowness of their progress, the slight degree of uneasiness which attends them, and also by their very great hardness."[1]

M. Brossant removed an exostosis of the os planum and of the internal angular process of the os frontis, by the application of caustic. The exostosis had increased to the size of an egg, and had displaced the eye outwards, and caused it to hang down, in some measure, on the cheek. A considerable portion of the tumour, ex-

[1] Middlemore's Treatise, vol. ii. p. 598.

foliated by the application of caustic, the eye regained its natural situation, and the cure was perfect.[1]

Case 10.—*Osseous tumour of the orbit.*—A farmer's daughter, 28 years of age, received a blow with a cow's horn on the upper and inner angle of the left orbit, nearly on the transverse suture, on the 25th of February, 1802. It was considered merely to be a slight contusion, and little attention was paid to it. In the beginning of March, however, a small hard tumour was discovered on the spot where the blow had been received, which gradually increased in size, without much pain, or any interruption to her general state of health, so that she continued her usual laborious employments about her father's house. On the 1st of October, 1802, she consulted Mr. Lucus, who found, covered by the upper eyelid, a very hard tumour, "of an oval form, and rather flat, somewhat more than an inch in its perpendicular diameter, and extending horizontally about an inch and a half in length, from the inner angle of the orbit towards the eye-ball, which is displaced. It seems to occupy the greater part of the socket, and has forced the eye itself forwards and outwards, so that the eye hangs pendulous and loose, and apparently entirely beyond the exterior edge of the outer angle of the orbit. The optic nerve and muscles must be considerably elongated, perhaps nearly an inch. She can still, however, discover objects with this eye, although its sight is much impaired; and she complains of little pain from the tumour, even when pressed or handled pretty freely.

"October 2nd.—Being certain that the examination would be attended with no danger, but might be productive of good consequences, I resolved to ascertain the nature of the tumour, which, although hard, appeared somewhat loose. With this view, I made an horizontal incision through the upper eyelid, about an inch in length, along the greatest diameter of the tumour, which, on separating and raising the edges of the wound, was discovered to be a solid piece of bone, covered only with the common integuments, and a thin membrane, somewhat resembling periosteum, and to which it was but slightly attached. No part of the bones of the orbit was denuded; and although the manner of its adhesion to the neighbouring parts could not be ascertained, the tumour remained firm and immoveable, notwithstanding considerable efforts were made to loosen it, and bring it away.

"The wound made by the incision did not heal up, but continued nearly of its original size, discharging a small quantity of thin matter, neither purulent nor fetid. The bone continued to increase in size; the eye was still more pressed out of its natural position, though some degree of sight still remained in it, and the girl continued in perfect health. At length, towards the end of September, 1803, the bone became carious and evidently loose, and protruding somewhat forwards. I endeavoured to extract it, by making, with

[1] Mémoires de l'Académie Royale de Chirurgie, tome v. p. 170.

a small scalpel, an incision round the edges of the former wound to detach it from any adhesions at its orifice, and by taking firm hold of it with a pair of strong forceps. The first attempt failed; but a second, made some days afterwards, succeeded; and I extracted, without much exertion or difficulty, a piece of bone, of an oblong shape, weighing an ounce and two drachms; an inch and a half in length, and two inches five-eighths in circumference; hard, solid, and pretty smooth.

"The eye-ball has, in a great measure, recovered its natural situation, and seems still to encroach on the cavity which contained the bone; although, for some months past, its progress has been but small. She has completely recovered the sight of the left eye, which is now equal to that of the right, and is scarcely more affected by fire or candle-light, or by looking stedfastly at any object; the only perceptible difference being, that it begins to water first."[1]

The orbital bones are sometimes enlarged in secondary syphilis, with protrusion of the eye-ball, and impairment or loss of vision. Mr. Wilson gives a case of this kind, which was cured by mercury, in the *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge*, art. xii. p. 115.

Symptoms of this kind may be produced by simple enlargement, or by true scirrhus of the lachrymal gland, by inflammation, suppuration, or developement of tumours in its structure, or the orbit being pressed on, and the eye protruded by tumours in the frontal sinuses, or the antrum of Highmor.

Aneurismal formations in the orbit are rare, and occur from unknown causes. "Aneurisms within the orbit give rise to exophthalmia, with excruciating suffering." The first symptoms which patients experience of the commencing disease, are a sudden and peculiar crack or snap in the orbit, frequently attended with much pain, and followed by protrusion of the eye, more or less imperfection of vision, whizzing noise in the head, pulsation of the eye-ball, and the protrusion of an elastic pulsating tumour between the eye and orbit. In the two case of aneurism by anastomosis, mentioned by Mr. Travers (Medico-Chirurgical Transactions, vol. ii. 1811,) and by Mr. Dalrymple of Norwich (Med. Chir. Trans. vol. vi. 1815) an effusion of limpid fluid in great quantity, took place into the eye-lids, a few hours after the sensation of the crack in the orbit, with such an increase in the severity of the pain, as to become intolerable. The pain was now accompanied by a noise in the head, which one patient compared to the blowing of a pair of bellows; the other to the rippling of water,—and both the pain and noise were insupportable, when the head fell below the natural level.

"I have seen," says Mr. Guthrie, "one case of true aneurism of the ophthalmic artery, of both sides, which terminated fatally. The symptoms were similar to those above mentioned, but no tumour

[1] Edinburgh Medical and Surgical Journal, vol. i. p. 405.

could be perceived; the eye was gradually protruded until it seemed to be exterior to the orbit, but vision was scarcely affected. The hissing noise in the head could be distinctly heard, and was attributed to aneurism. On the death of the patient, an aneurism of the ophthalmic artery was discovered on each side, of about the size of a large nut; the vena ophthalmico cerebralis was greatly enlarged, and obstructed near where it passes through the foramen lacerum orbitale superius, in consequence of the great increase of size the four rectimuscles had attained, accompanied by an almost cartilaginous hardness, which had been as much concerned in the protrusion of the eye as the enlargement of the vessels. The disease existing on both sides, prevented an operation on the carotid being attempted, to which, indeed, the patient would not have submitted." [1]

CHAPTER V.

Amaurosis from affections of the Brain.

In the advanced stages of inflammation of the brain, (acute inflammation) amaurosis is not an uncommon symptom; and, indeed, in hydrocephalus, it usually marks the termination of the second, or the commencement of the third stage. "The eye," says Dr. Abercrombie, "loses its acute sensibility, becoming dull and vacant, often with squinting and double vision; and these are often succeeded by dilated pupil and blindness, even before the patient falls into coma." [2]

Sect. I.—*Chronic Inflammation of the Brain.*

Symptoms.—Chronic inflammation of the brain is characterised most frequently by headach of a peculiarly fixed and permanent nature, gradual failure of the intellect, paralysis of the optic nerve, and of the other nerves of the senses, paralytic affections of the facial muscles, or a gradual, but progressive paralysis of the muscles of the extremities, which has received the appropriate name of creeping palsy. These symptoms may occur separately, or combined in various ways; or there may be, in addition spasmodic movements, or contraction and rigidity of the extremities, fatuity, convulsions, or apoplectic attacks.

[1] Guthrie's Operative Surgery of the Eye, p. 168. Edit. 3.
[2] Abercrombie's Pathological and Practical Researches on Diseases of the Brain and Spinal Cord, edit. 3. p. 9.

"One of the distinguishing features," observes Dr. Crawford, "of these various forms of disease is, their very slow progress, owing to the low state of inflammation of the parts affected; they have been known to last for years, and even during a great part of a patient's life; and an apparently very slight degree of inflammation has, in some cases, given rise, for a considerable length of time, to the most urgent symptoms. The inflammation has been excited, in some instances, by an injury so trivial, as to escape the patient's attention; though it should be kept in view, that it is not always confined to the part which was the seat of the injury, but has sometimes a tendency to spread over the cranium. It may also occur spontaneously; in which case, it is occasionally connected with a syphilitic taint, or scrofulous diathesis."[1]

Treatment.—The treatment of amaurosis depending on chronic inflammation of the brain, must be strictly antiphlogistic: namely, local abstraction of blood, by cupping or leeches, adapted to the powers of the individual, and the severity of the inflammatory symptoms; counter-irritation, efficiently produced by issues, setons, blisters, or the tartar emetic ointment; stimulating pediluvia, and cold applications to the head, which should be shaved; purgative medicines in laxative doses; mercury, or iodine; quiet of mind and body; careful regulation of the diet, and an especial avoidance of all exciting causes.

Sect. II.—*Amaurosis from Organic Diseases of the Brain, its Vessels, Membranes, or the Cranial Bones.*

"By organic disease of the brain," observes Dr. Abercrombie, "we understand either permanent changes of the cerebral substance itself, or new formations within the head. These may be either imbedded in the substance of the brain, or attached to its surface." (Loc. cit. p. 312.) The cerebral symptoms which accompany the amaurosis, result either from compression and irritation, with or without chronic inflammation. "In some cases," Dr. Copland remarks, "resulting from organic disease within the head, cerebral symptoms, particularly those of an acute kind, are not complained of until the amaurosis is far advanced." (p. 56.)

Headach, whether severe or mild, almost always attends the progress of cerebral amaurosis. The headach is usually of a very permanent and stationary kind, seldom entirely disappearing, but extremely liable to occur in violent paroxysms; "but the remissions from this severe suffering are often so remarkable, as to lead a superficial observer into the belief that it is merely periodical headach, or headach connected with dyspepsia." The kind of pain differs remarkably in different cases; sometimes it is acute and lancinating; at other times oppressive and obtuse. It is frequently

[1] Cyc. of Pract. Med. Art. Inflammation of the Brain, p. 292. vol. i.

referred to a particular spot. During the severe paroxysms of pain, the headach is aggravated to perfect torture, by the slightest motion. The headach is increased by mental application, stooping, stimulants, &c.; and it is usually attended by dyspeptic symptoms, vomiting usually occurring during the severer paroxysms; but the cephalalgia attended by dyspepsia, sympathetic of cerebral disease, unlike the headach occasioned by dyspepsia, is increased by cheerful conversation and employments, by which the latter is frequently discussed.

"After some continuance of fixed headach, the organs of sense become affected, as the sight, the hearing, the taste and smell, and occasionally the intellect. The loss of sight generally takes place gradually, being first obscured, and, after some time, lost; and very often one eye is thus affected before the other is at all impaired. Double vision also occurs, which either may be permanent, or occur at intervals. One remarkable case will be referred to, in which the blindness took place rather suddenly, and, after it had continued for some time, sight was restored under the action of an emetic. It remained distinct for an hour, and then was permanently lost. The intellect is frequently impaired in cases of this class, and sometimes the speech is lost. The morbid appearances present no uniformity; in two of them there were tumours so situated, as directly to compress the optic nerve; in another, a large tumour pressed upon the corpora quadrigemina; in a third, the disease was situated at the lower part of the anterior lobe; and in another, in which the right eye only was affected, it was in the substance of the left hemisphere, near the posterior part. In a case by Drelincurtius, the disease was an enlargement of the pineal gland; and in another, in which there were both blindness and deafness, a large tumour was situated between the brain and the cerebellum."[1]

Amaurosis from organic disease within the cranium is frequently complicated with epilepsy, apoplexy, paralysis, and abolition of the mental powers. And it is remarkable, "that tumours, for example, will be found under the first class, unaccompanied by any remarkable symptoms; while, under the other classes, tumours in the same situation, and of no larger size, were accompanied by blindness, convulsions, or paralysis. It does not appear that these diversities depend either on the size of the tumours, or, as far as we know at present, upon their particular structure. But these points remain to be investigated; particularly what diversity of symptoms is connected with the nature of the tumours, and especially with their characters, as being tumours distinct from the cerebral mass, or as being indurations of the substance of the brain itself."[2]

The organic diseases within the cranium, which occasionally produce amaurosis, are such as result from inflammation, softening, serous effusion, induration, abscess; or various kinds of tumours,

[1] Abercrombie's Pract. Researches on the Brain, &c. p. 318.
[2] Abercrombie, p. 322, 323.

tuberculous formations, adipose tumours, fleshlike tumours, adenoidea (Cragie), tumours of a fibro-cartilaginous nature, bony and calcareous concretions, hygromatous tumours, cysts containing a serous or albuminous fluid, hydatids, fungus hæmatodes, melanosis, the hæmatomatous tumour; diseases of the vessels, aneurisms; of the membranes, thickening, deposition of new matter between their laminæ, the formation of a pellucid or semi-pellucid substance having the characters of albumen under them, dense tumours, of a uniform whitish or ash-colour, and exhibiting the appearance and the properties of coagulated albumen, which are most frequently attached to the dura mater; diseases of the cranial bones, osteosarcoma, exostosis, &c.

Amaurotic symptoms.—The imperfection or loss of vision, which results from organic cerebral disease, more commonly affects one eye previously to, or without the other, "and if both are attacked, the amaurosis is more rapid in one than in the other, and frequently at the commencement of the disease the field of vision is not equally obscure." [1]

The patient complains of muscæ or scotomata, or sometimes there is increased sensibility to light, with luminous spectra and contracted pupil; not unfrequently objects appear distorted and confused, with convulsive movements of the globe or eye-lids. As the amaurosis becomes more complete, the vacant stare of the amaurotic is acquired, the pupil becomes widely dilated and motionless, and the muscles paralytic which were previously convulsed. The eye usually appears, on examination, free from all organic changes, and the retina, as far as can be ascertained, perfectly sound in its structure; but "the appearance of the eye, and particularly of the pupil, is not to be depended upon; for, although the pupil is usually dilated and immoveable, the exceptions are too numerous to admit of considering it as an uniform occurrence." [2]

Causes.—Blows on the head, in many cases so slight as to have been forgotten, and which frequently have occurred many years before the development of any morbid symptoms, fevers, coup de soleil, fatigue, anxiety, cold, the strumous diathesis, syphilis, intemperance, violent anger, excess of mental labour, suppression of accustomed discharges, &c.

Treatment.—A great deal may frequently be done to retard or put a stop to the progress of organic diseases of the brain, by quietness of the mind and body, low diet, gentle purgatives, mercury, iodine, or arsenic, counter-irritation, and occasional general or local abstraction of blood. The head should be shaved and kept cool, while stimulating pediluvia are used frequently, and the feet kept warm.

Case 1.—"A boy," says Dr. Abercrombie, "aged 7, (for whose case I am indebted to the late Dr. Gregory,) in the beginning of the

[1] Tyrrell, Cyc. of Pract. Surg. vol. i. p. 94.
[2] Copland's Med Dict. vol. i. p. 56.

year 1811, received a severe injury of the forehead and nose by a fall, his nose being nearly flattened by it. From this time, he complained of headach, and, after two or three months, became near-sighted. Soon after, his sight became indistinct, and, after four or five months more, this was followed by blindness. About this time he began to be epileptic, and to be affected with weakness of the lower extremities, which gradually increased to perfect paraplegia. He died in April 1812, after coma of three days, his intellect having continued entire till that time.

"*Inspection.*—A firm white flat tumour, the size of a large bean, lay over the junction of the optic nerves. The ventricles contained twelve ounces of clear fluid. The left lobe of the cerebellum was much indurated; and the right lobe was reduced to a mass of unhealthy scrofulous suppuration."[1]

Dr. Abercrombie remarks that nearly similar to tubercular disease of the brain, appear to be those cases where albuminous matter in a pure state is deposited in cysts, in various parts of the brain, or under the membranes. The symptoms connected with some of these are very remarkable.

Case 2.—"A man, aged 50, had been for some time affected with cough and bloody expectoration. In June, 1818, he was seized with headach, and some confusion of thought, which appeared chiefly in a tendency to misapply words. The pain, which was referred chiefly to the forehead, increased in severity, and attacked him in violent paroxysms. The sight of his right eye was impaired, and soon after lost, and his speech became indistinct, and, after some time, inarticulate. Six weeks after the commencement of these complaints all the symptoms were increased. Violent paroxysms of pain were excited by the least motion, and even by change of posture in bed. He seldom attempted to speak, but he often pressed his hand on his forehead, and seemed to have uneasiness in his right arm. He had some squinting, with general weakness and paleness, and his intellect was evidently impaired. He died in August in a state of coma. The pulse had been usually natural, sometimes slow.

"*Inspection.*—In the substance of the left hemisphere of the brain, towards the posterior part, there was a soft and vascular cyst, containing about two ounces of a thick colourless albuminous fluid, coagulable by heat, and exactly resembling the albumen of an egg. The cerebral substance around the cyst was softened; the brain in other respects was healthy. The ventricles contained a small quantity of serous fluid, and had no communication with the cyst." (Loc. cit. p. 174.)

Case 3.—*Pain of head in the occipital region, of three months' date.—Hemiplegia of the left side established gradually.—Latterly, convulsive movements of the paralysed limbs.—Blindness.—Considerable softening of the right lobe of the cerebellum.*

[1] Loc. cit. p. 172, 173.

—"A seamstress, thirty-one years old, had always enjoyed good health. About six weeks before entering La Charité, she experienced a fright whilst menstruating; the menses were suspended, and immediately after their disappearance, she was seized with dizziness, and an acute pain in the back part of the head toward the right side. The dizziness disappeared after bleeding, but the pain of the head remained; it was unconnected with any other symptom for eight days; subsequently, the patient began to experience an annoying sense of formication at the ends of the fingers of the left hand; she could use this hand but awkwardly, and was astonished at seeing what she handled with it fall continually. Soon she became unable to work with it, the entire arm seemed very heavy. After some time, the lower extremity of the left side became weaker, and in about a month, the patient had complete hemiplegia on the left side. But at the same time that the patient thus lost the power of motion of one of the sides of the body, her sight, till then very good, became very weak, and five weeks after the appearance of the first symptoms, she became completely blind.

"This was the state in which we first saw her—deprived of sight, and of the power of moving the limbs of the left side; then the pain of the head became less acute; the patient, however, still felt it, and referred it to the lower part of the occipital region of the right side; the paralysed limbs were flaccid, and allowed themselves to be moved in all directions, the skin covering them still retained its sensibility; no trace of paralysis on the face; the pupils, moderately dilated, still contracted on the sudden approach of light; the appearance of the eyes, natural; there was, however, complete blindness; she could scarcely distinguish day from night; intelligence perfect; the pulse natural; the menses had not re-appeared since they were suppressed by the fright. Leeches were first applied to the nape of the neck, then to the genital organs; aloetic pills were frequently given, and subsequently the back of the head was covered with a blister.

"No change appeared for the three first weeks of her stay in the hospital; then, without any known cause, the pain of the head suddenly became more violent, and extended to the entire cranium; the extremities of the left side, which till then had remained entirely immoveable, were several times agitated with convulsive movements, which were slight in the lower extremity, but very violent and almost continual in the upper limb; acute pains accompanied these convulsions; the intelligence soon became disturbed; complete delirium set in; for twenty-four hours the patient spoke, and became agitated incessantly; she then fell into a profound coma, in which she died.

"*Post-mortem.*—The pia mater extended over the convexity of the cerebral hemispheres was very much injected, as was also that covering the hemispheres of the cerebellum. The substance of the brain, properly so called, was marked with a considerable number of red points, and presented no other lesion; lateral ventricles dis-

tended with a great quantity of limpid serum; the fornix and septum lucidum natural. Externally the cerebellum appeared healthy; but we had scarcely removed some layers of the substance of its right hemisphere, proceeding from above downwards, when we found an immense cavity, where this substance, deprived of its normal consistence, was changed into grayish bouillie; this softening occupied at least two thirds of the right hemisphere of the cerebellum; it partly attacked the prolongations which go from the cerebellum, either to the spinal marrow, or to the tubercula quadrigemina, or to the annular protuberance; it did not extend as far as the lower surface; in no part of its extent was there either injection or infiltration.

"*Remarks.*—This softening, seated in one of the hemispheres of the cerebellum, and occupying a considerable portion of it, presented in its symptoms and progress the greatest resemblance to softening of the brain. Here, again, as in the cases of hemorrhage of the cerebellum cited above, the paralysis existed on the side opposite to that on which the softening existed. There was neither in motion nor sensation any special disturbance connected with the functions assigned to the cerebellum by some physiologists. The intelligence, to be sure, retained all its integrity: but was it not also found to be intact in more than one case of softening of the brain? The seat of the pain alone could incline us to suspect that of the disease. With respect to blindness, it seems at first that it has nothing to do with diseases of the cerebellum, and yet this case is not the only one in which different affections of the cerebellum have been accompanied by a loss of vision. May this fact be explained by the anatomical relations established between the cerebellum and the tubercula quadrigemina by means of the prolongations known by the name of *processus a cerebello ad testes?* The symptoms which supervened during the latter period should not, in our opinion, be connected with softening of the cerebellum; they depended on a complication, and we think that we may refer them to the bright red injection presented by the meninges, as well as the great quantity of serum contained in the ventricles.

"We know of but few cases in which a softening of the nervous centres succeeded in so marked a manner to a moral impression; the latter had at the same time the effect of suppressing the menses, and it is a remarkable coincidence that in this particular case, where there was disturbance in the performance of a function assigned to the genital organs, the same cause which produced this disturbance exercised its influence also on the cerebellum."[1]

Case 4.—*Tuberculous mass in the left lobe of the cerebellum.—Pain of head.—Hemiplegia on the left side.—Blindness.—Intelligence retained.*—"A laceman, aged twenty-nine years, presented the following state:—such a weakness of sight that he could

[1] Andral's Clinique Medicale, translated by Dr. Spillman, book 1st, p. 202, 3, 4.

scarcely distinguish day from night, and still considerable contraction of the two pupils; natural sensibility of the face still preserved; pain all over the head, but more acute towards the occipital region; hemiplegia of the left side complete, without contraction or modification of the sensibility of the paralysed limbs. Nothing remarkable in the movements of the tongue; intelligence perfect; frequent cough; some dyspnœa; pale and emaciated; subject to diarrhœa; He entered La Charité, where for the first fifteen days he complained of nothing additional, except that during this time he had diarrhœa, for which leeches were applied to the anus. He told us that, for about the last three years, he had a very painful headach, intermitted at first, and which subsequently became continued; he also states that, during this time, he gradually lost the power of seeing, and that of motion in the extremities of the left side; still further, about two years ago, he continued struck for the space of three months with complete insensibility of all the left side of the face; then he no longer had any taste for food, and the mucous membrane lining the interior of the left cheek seemed to be separated, as by a piece of linen from the objects brought in contact with it. He always continued to hear equally well with both ears.

"After a fortnight's stay in the hospital, he was carried off in less than three days by an acute peritonitis.

"*Post-mortem.—Cranium.*—Nothing remarkable in the cerebrum. But on viewing the cerebellum externally, its right lobe was observed no longer to have its usual form; it was marked with eminences (bosselé) and its laminæ no longer have their ordinary direction, nor their natural relations; several were effaced. We scarcely penetrated some lines in depth, when in the inner half of the lobe, and in all its height, we find, instead of the tissue which should form it, a hard substance of a yellowish-white colour, possessing all the characters of tubercular matter; there was no softening in any part.

"*Thorax.*—Some miliary tubercles were scattered through the two lungs.

"*Abdomen.*—The peritoneum was filled with a purulent liquid. A great number of small white bodies raised the mucous membrane of the ileum, and resembled so many tubercles. Small ulcerations were found towards the end of this intestine, one of which established a communication between the interior of the intestinal canal and the peritoneum; whence the peritonitis. The spleen also contained some tubercles.

"*Remarks.*—A pain, the principal seat of which was conformable to that of the lesion, paralysis, which took place on the side of the body opposite to the latter, and the loss of sight,—such were the symptoms here accompanying the development of the tubercular matter, in one of the lateral lobes of the cerebellum. They are the same symptoms as those occasioned by the different affections of the cerebellum, already described; only here they are developed very slowly, and continue much longer. In the midst of all this

disturbance, the intelligence remained intact. With respect to the extraordinary loss of sensibility, observed for the space of three months in the left side of the face, and which was accompanied by the complete abolition of the sense of taste, could this have been occasioned by a temporary affection of the fifth pair of nerves?

"There were tubercles in several other organs also, as well as in the cerebellum. Those contained by the lung, confirm the law laid down by M. Louis."[1]

Case 5.—"An officer who had seen much service,—severe headach, which subsided and left a feeling of tightness across the forehead. After six or eight months' blindness of the right eye, then blindness of the left. Under the operation of an emetic, the sight of the left eye was recovered for an hour; afterwards perfect blindness, and pupils insensible, but no other complaint, except disordered stomach, and frequent inclination to vomit. Death from coma, after two years.

"*Morbid appearances.*—Four ounces of fluid in the ventricles; a tumour, the size of a hen's egg, containing a thick purulent fluid, under the anterior part of the brain, and interposed betwixt the optic nerves, which were much separated by it from each other. Below, it was attached to the pituitary gland, which was very soft, and enlarged to five or six times its natural size.—Med. Trans. vol. v. Dr. Powell."[2]

Case 6.—"A man, aged 47. Headach and weight in the head, increased by stooping. Began in May, 1816, and increased gradually, notwithstanding copious evacuations. In August his sight began to diminish, with giddiness; in September, could only see objects in a very strong light; in December, perfect blindness—pain still constant and severe. In the middle of January, stupor and forgetfulness; and died comatose, on the 31st.

"*Morbid appearances.*—A tumour, the size of a large egg, attached to the tentorium in such a manner, that part of it lay above it, and part below it; the falx likewise entering into its substance above. Internally it was firm, and resembled the structure of the kidney—four ounces of fluid in the ventricles."[3]

Case 7.—A young woman, aged 19—Headach, vertigo, suffusion of the eyes; paroxysms, in which she fell down insensible, without convulsion. They attacked her once in three weeks, and at each time there were two paroxysms at the distance of twelve hours; after eight or nine months, these attacks increased in severity. She had then loss of hearing, sight, smell; and her speech and deglutition were much impaired. Soon after this, died apoplectic.

"*Morbid appearances.*—Embedded in the substance of the right hemisphere, there was an hydatid, three inches long, and two broad, and very vascular. Brain, in other respects, healthy."[4]

[1] Clin. Med. p. 211.
[2] Abercrombie on the Brain, &c. p. 438.
[3] Abercrombie loc. cit.
[4] Yelloly, Med. Chir. Trans. vol. ii. p. 238. (Abercrombie, p. 441.)

Amaurosis from enlargement of the pituitary gland, generally affects both eyes; the patient complains of weight and pain in the anterior parts of the head, disinclination for any exertion, apathy, loss of memory, impairment of the intellect, and general weakness.

Case 8.—*Amaurosis from enlargement of the pituitary gland.* —"John Austin, baker, a strong muscular man, of temperate habits, aged 38, for three years past has been afflicted with dimness of vision, accompanied, at intervals, with severe pains in the anterior part of the head, and with a sense of burning and fulness in the orbits, which was at times so distressing as to cause him to apply for advice. He had leeches, blisters, and such medicines as were deemed most proper, without receiving benefit; on the contrary, the application of leeches appeared to increase rather than diminish his sufferings. Notwithstanding this, his strength and general health continued very good, being up during the greater part of the night, and frequently carrying very heavy loads during the day. The digestive organs had been, for the most part, regular in their functions, excepting at slight intervals, and then only from such causes as might be considered wholly independent of any existing local affection.

"Sunday, May 25, 1823, he again applied for advice, and complained that, during the last five or six weeks, the dimness of vision had considerably increased; that the pains had been much more severe; that he had felt a strong inclination to sleep, so much so that if, during the day, he sat down for a few minutes to refresh himself, he fell asleep, being unable to prevent it, and would continue until disturbed; and that for the last two or three days he had been completely blind with the right eye, and this morning found himself, for the first time, totally blind with both: for the last week or ten days he had been able to distinguish objects, but upon going to bed last evening, the only object he could discern was the candle, and that not distinctly. On examining the eyes, no very apparent disease manifested itself; the pupils did not contract on the application of a strong light; they appeared rather small, but perfectly clear; he complained of some loss of appetite which had existed for a few days only; pulse 96, and small; natural secretions as usual. Supposing that some of the more prominent symptoms depended on the disordered state of the stomach, he was ordered an emetic, and after its operation, five grains of calomel, to be succeeded on the following morning by an opening draught.

"Monday, on being seen at two o'clock, it was found that the medicines had operated very well, having produced several bilious motions; headach not so considerable, and in a small degree had recovered his sight in the left eye; he could see the window, and on placing the hand before his eye, could distinguish something, although unable to tell what it was. The whole of the above medicines were again ordered to be repeated.

"Tuesday, he complained of being much weaker, and in conse-

quence, kept his bed, which he had not previously done; headach better; vision as yesterday; slept constantly, and snored very loudly. Six leeches were ordered to the temples, the calomel and opening medicine to be continued, and a blister to be applied to the nape of the neck.

"Wednesday, an eminent oculist being called in, he considered the illness to arise from congestion in the cerebral vessels, and ordered twenty ounces of blood to be taken from the arm, with a saline draught every four hours: and concluding that it was a medical case, he declined his further attendance; the patient fainted when he was bled.

"Thursday, he was more inclined to sleep; was roused with much difficulty, but when awake, spoke very sensibly, and answered the various questions put to him; since the bleeding the pulse was weaker, and 120; debility greater. This morning a physician being called in, he was ordered to lose twenty-four ounces of blood from the arm, the saline medicine to be continued, four grains of calomel to be taken at bed-time, and an opening draught on the following morning.

"Friday, at half-past twelve, he died; and on the following day, when he was examined, the following appearances presented themselves:—the membranes of the brain were quite healthy; some degree of fulness of the vessels existed, but it was only very trifling; the fluid in the ventricles was about the natural quantity; on raising the anterior lobes of the brain, a tumour was found arising from the situation of the pituitary gland, and pressing upon the optic nerves; it was of considerable size, forming a nidus in the anterior lobes; the optic nerves were very beautifully expanded upon it; the right diverging nerve was rather more expanded than the left; the olfactory nerves were likewise very much pressed upon."[1]

Case 9.—*Amaurosis from an osseous tumour on the inner surface of the left parietal bone.*—"A man, (age not mentioned)—severe headach, followed by amaurosis and epileptic paroxysms, which occurred almost daily. He died in an apoplectic attack.

"*Morbid appearances.*—On the inner surface of the left parietal bone, there was an osseous spongy tumour three inches broad, and more than an inch in thickness.—Wepfer."[2]

Aneurismal affections of the cerebral arteries occasionally produce amaurosis.

Case 10.—A labourer, aged 57, became suddenly insensible whilst at work, about the beginning of March, but quickly recovered without assistance, and resumed his employment. He had another attack three weeks after, remaining in a state of stupor three or four days. He complained of constant pain at the top of the head, which was much increased by stooping, and frequently

[1] Ward, in London Medical Repository, vol. xx. p. 217.
[2] Abercrombie, p. 443.

deprived him of sleep. His countenance appeared dejected, heavy, and sallow. He was morose and sullen, frequently refusing to give any answer to questions, and finding fault with his attendants. The pupils were much dilated, but still slowly contracted on the admission of strong light. The right eye was affected with cataract, although the patient could distinguish light from darkness with this eye. His pulse was usually about ninety, but weak. He was freely purged, and a blister was applied to the nape of the neck. By these means he was somewhat relieved; but after a few days the pain became as constant and distressing as ever. He now had eight ounces of blood removed from the neck by cupping, with great relief to the pain. He again became comatose and insensible four days after this, whilst sitting at dinner; his pulse full and slow, his respiration hard and stertorous. The pupil of his right eye was dilated; but that of the left contracted; both were immoveable. He was now freely bled from the arm, and blistered; but he became rapidly worse, and died next morning.

On dissection, the dura mater was found to adhere more strongly than usual to the cranium, and it presented a blackish-blue appearance from the veins beneath. There were adhesions between this membrane and the arachnoid, and between the latter and the pia mater. The veins of the pia mater were enlarged, and gorged with blood. Three or four fungous patches had risen from the surface of the cerebrum, through the membranes, and adhered to the bone. The falx being raised, it was found united to both hemispheres, and these below the falx to each other. A considerable quantity of a fluid deeply tinged with blood escaped as soon as the left ventricle was penetrated, and a small coagulum was found entangled in the plexus choroides. In removing the upper surface of the right hemisphere, the right lateral ventricle was cut into, being raised above its natural level, and a quantity of coagulated blood was discovered, amounting to three or four ounces. The right corpus striatum was enlarged to more than twice its ordinary size. The surface of the corpus striatum, and the sides of the ventricle were abraded and pulpy, having a pinkish-green appearance. On removing the brain from the cranium, a long red streak was observed on the under surface of the right anterior lobe, and under this was discovered an abscess, rather more than an inch in length. Immediately behind this, to the other side of the olfactory nerve, before the junction of the optic nerves, an aneurism, of the size of a hazel nut, of the right anterior cerebral artery, was found compressing the right optic nerve. The coats of the aneurism were very thick, and its cavity contained a small coagulum. On its upper surface it had burst into the lateral ventricle.

The sheath of the right optic nerve, especially at the entrance of the nerve into the eye, was found thickened and distended with blood, and was firmly adherent to the proper substance of the nerve. The veins on the back of the sclerotica were much enlarged.

The choroid had its usual appearance; but the retina was of a

pinkish-gray colour, and the ramification of its central vein could readily be seen over its whole surface, so far as the lens. The posterior capsule of the lens was opaque; the lens semi-opaque, and wasted to one half of its natural size.[1]

SECT. III.—*Amaurosis from Concussion and Injury of the Brain.*

Injuries of the head, whether attended by concussion or wounds and injuries of the brain, or by fracture of the cranial bones with depression, produce, frequently, imperfection or loss of vision, which may be temporary or permanent.

The amaurosis which results from the pressure of fractured cranium with depression, is, with the other apoplectic symptoms, developed immediately after the accident; but when extravasation of blood is the consequence of the blow, the collection may form slowly, and thus the symptoms arising from it may be likewise slowly developed.

CASE 1.—"I have seen a patient," says Mr. Lawrence, "who was stunned by falling down a flight of steps in the night. There was no external wound; but the right temple had come to the ground. He found himself blind with the right eye, but had no other symptom of injury of the head. When I saw him on the fourth day after the accident, no active measures had been adopted. Both pupils were about the middle size; the iris moved very slightly in each eye, perhaps less in the right than in the left. He could not see the persons who stood round him in the room; but in looking straight forwards he faintly discerned an individual placed on his right side." (p. 493.)

CASE 2.—"James Armour, aged twenty-seven, a quarrier, admitted 8th of May. The accident had happened a week previously, and was occasioned by a quantity of earth falling upon him. He remained insensible for two hours, during which considerable hemorrhage is said to have taken place from the right ear. On recovering, he felt acute pain on the right side of the head, for which he was twice bled with marked relief. On admission, he had little or no uneasiness, and complained chiefly of giddiness when he attempted to raise his head from the pillow. He was perfectly blind of the left eye, the pupil of which, however, contracted freely on exposure to light. The sense of hearing in the right ear was much impaired. His mouth was slightly drawn towards the left side, which deformity increased greatly when he spoke."[2] In the course of a month his other symptoms were in great measure removed, but his sight was not restored.

Mr. Wardrop has seen "several cases where vision was suddenly destroyed from a blow on the head."

[1] Mr. Spurgin, in the London Medical Repository for June 1825. p. 453.
[2] Dr. Auchincloss in the Glasgow Med. Jour., vol. iii. p. 201.

Case 3.—*Amaurosis from fracture of the parietal bone with depression.*—An old man, who had been run over by a cart, was admitted into St. George's Hospital. There was fracture and depression of one of the parietal bones. He was sensible, but peevish, and answered questions slowly; it was observed that he was totally blind. Mr. Gunning removed a portion of the parietal bone by the trephine, and elevated the depression; but no change was produced in the symptoms by the operation. About thirty-six hours after the accident, his pulse became frequent, and he was delirious. He continued quite blind; believing that he saw imaginary objects, but quite unconscious of the existence of those actually before his eyes. He died at the expiration of the fifth day. On examining the body, the membranes of the brain were found smeared with pus and lymph, and inflamed. There was a transverse fracture in the basis of the cranium extending across the sphenoid; the fractured edges were displaced in such a manner as to press on the optic nerves immediately behind the orbits, and thus to account for, in the most satisfactory manner, the total loss of sight.[1]

Sect. IV.—*Amaurosis from Disordered Circulation in the Head, and from Apoplexy.*

Dr. Abercrombie divides amaurosis into three classes:—1st, simple apoplexy depending solely on disordered circulation, in which no morbid changes are discoverable after death; secondly, apoplexy with serous effusion; thirdly, apoplexy depending on effusion of blood.

"The apoplectic attack is generally," observes Dr. Abercrombie, "preceded by symptoms indicating some derangement of the circulation in the brain. The most remarkable of these are the following:—headach, giddiness, sense of weight and fulness in the head, violent pulsation of the arteries, and confused noises in the ears. These symptoms are often accompanied by epistaxis, which may give a partial and temporary relief; by loss of recollection, and incoherent talking, resembling slight intoxication; by affections of the sight, double vision, and temporary blindness; by drowsiness and lethargic tendency. We also frequently observe indistinct articulation, and other partial paralytic affections. These are sometimes confined to one limb, or part of a limb; sometimes affect the eye-lids, producing inability either to shut the eye, or to open it; and frequently impair the muscles of the face, producing a slight distortion of the mouth." (p. 203.)

Apoplexy may be attended with amaurosis as one of its most remarkable symptoms.

Case 1.—A coal-weigher, fifty-five years old, suddenly became

[1] Sir B. Brodie in the 14th vol. of the Med. Chir. Trans.

amaurotic in the right eye. "Whilst attending to his business, he was suddenly seized with giddiness and slight pain in the head, with the feeling of a snap as if something had given way. From the immediate effects of this he recovered in a few minutes, but found that he was unable to elevate the right upper eyelid; and that when he had done so with his fingers, he saw only the half of objects, and that very indistinctly. He was assisted home, where he remained quiet for two days. On looking at him, the first thing that attracted my attention, was the upper eyelid hanging down over the eye-ball, so as completely to conceal it. He had no power whatever over it. On examining the eye-ball it appeared perfectly sound. The pupil was very much contracted and immoveable, being as small as a pin's head; did not dilate with belladonna. Stated that three weeks previously he had a slight paralytic shock, of which he recovered; and that he had been subject to hemorrhoids, and strongly suspects this attack to have been brought on by their getting better. Bowels were also confined."[1]

A fit of apoplexy may occasion permanent amaurosis, or the blindness may be recovered from, as the paralytic symptoms, sooner or later after the attack.

Disordered circulation in the head may arise from violent fits of passion, intemperance, plethora, anæmia, impeded return of the venous blood, depending either on disease of the veins themselves, or on any mechanical cause, &c. "Upon the whole," says Dr. Abercrombie, "it seems highly probable that a certain balance of the circulation of the brain is necessary for the healthy condition of its functions; that they are equally impeded by the interruption which takes place in apoplexy, and the diminished impulse which occurs in syncope, and in many affections of extreme exhaustion; and that there is a remarkable similarity in the symptoms which occur in these opposite conditions. What indeed is syncope? but an abolition of sense and motion. It is preceded by giddiness, tinnitus aurium, and impaired vision, and is accompanied by blindness, dilated pupil, perfect insensibility, and not unfrequently passes into convulsions. It differs then from apoplexy, chiefly or entirely in the state of the general circulation, the symptoms accompanying the two affections being remarkably similar, and the effect upon the sensorial functions almost entirely the same." (p. 310.)

Sect. V.—*Amaurosis from Sympathetic Irritation.*[2]

The sympathy of the brain with the stomach and intestines, and the uterine system, has been long known to produce, occasionally, imperfection or loss of vision; but the exact pathological condition,

[1] Mr. Knox, in Glasgow Med. Jour., vol. iii. p. 348, 349.

[2] This section might perhaps have been with more propriety considered under affections of the brain, optic nerve, and retina conjointly, although

so induced, may vary in different individuals; the most frequent result, evidently, is congestion, in addition to the peculiar disturbances induced under the term sympathy. This form of amaurosis is seldom complete, and, during the early stages, ceases on the removal of the dyspeptic or uterine irritation.

Symptoms.—The pupils are generally dilated, and move sluggishly; the patient complains of muscæ volitantes, and other ocular spectra, and frequently of hemiopia; there may be strabismus and spasmodic nictitation.

The attacks of amaurosis are frequently sudden, and of no long duration, sometimes periodical, and are attended generally, when depending on gastric or intestinal irritation, by headach, nausea, flatulence, acidity, foul tongue, and either diarrhœa or constipation; and the patient complains of languor, chilliness, general indisposition, and, in females, great nervous susceptibility, or hysteria.

Causes.—Sedentary and indolent habits, worms, confinement in close unventilated apartments, unwholesome and indigestible ingesta, excessive eating and drinking, constipated bowels, but especially a loaded state of the colon, or in fact any cause that is capable of inducing abdominal or uterine irritation.

Treatment.—Our treatment must be such as is calculated to remove the disordered condition of the stomach and bowels, adapting our remedies to the obtaining pathological condition. When depending on uterine irritation, the remedial measures will vary of course, as the affection is either amenorrhœa, dysmenorrhœa, menorrhagia, &c. or depending on organic disease.

Local measures.—Blisters should be applied behind the ears, or a more permanent drain be kept up by the ointment of the potassio tartrate of antimony, setons, &c.; and, in cases where there is no evidence of local inflammation or active congestion, we may make trial of the local application of strychnia, electricity, and stimulating applications and vapours to the conjunctiva.

Case 1.—Robert Wreford, aged 45, was admitted as an outpatient of the West of England Eye Infirmary, in January, 1839. He complained of great imperfection of vision, but especially in the right eye. He had left London a few weeks previously, and had come to reside in Devonshire for the benefit of his health, which was much deranged from confinement, and the unhealthy atmosphere of the metropolis. His countenance and conjunctivæ were of a dusky yellow colour, and he complained of great disorder of his digestive organs, which he stated had continued for a considerable time. There was strabismus of the right eye inwards; the pupils were dilated, and the irides acted sluggishly; that of the right eye scarcely moved at all. He was directed to take five grains of the pil. hydrarg. and a similar quantity of the compound

the brain is especially disturbed by sympathetic irritation, and doubtless contributes, in no small measure, to the production of the amaurotic symptoms, whatever the pathological condition induced may be.

pil. colocynth. every night, to apply the ointment of the potassio tartrate of antimony to the back of the neck, and to pay especial attention to his diet and general health. By the persevering employment of these measures, he recovered, in a short time, the use of the left eye completely, with great improvement in the visual powers of the right.

Case 2.—"A child," says Mr. Wardrop, "who had worms, besides amaurotic symptoms, had nearly lost altogether the sense of hearing, but recovered both senses as soon as the disease of the bowels was removed."—(p. 196.)

Case 3.—*Complete amaurosis of some months duration, caused by a loaded state of the bowels, and cured by clearing the alimentary canal.*—A boy, nine years of age, was brought to Mr. Wishart, with complete blindness of the left eye, which was insensible even to bright sunshine: the pupil was of natural size, and the iris moved readily. The right eye was unaffected. Pain was occasionally felt over the left eye. He was pale and languid; and the tongue was slightly loaded. He had been always subject to disorder of the stomach from any irregularity of diet, apparently from his nurse having been in the habit of giving him whiskey to quiet him at night. The loss of sight, which had lasted about four months, was said to have occurred in consequence of his grandmother's death having been incautiously communicated to him. An emetic of ipecacuanha was first administered, and was followed by two pills, night and morning, consisting of the compound extract of colocynth, with one grain of calomel, and the same quantity of James's powder. The emetic and the pills operated freely; the latter were continued for twelve days. The vapour of the liquor ammoniæ was applied to the eye three or four times a-day; and, at the end of a week, a small blister was placed over the mastoid process, and subsequently dressed with savine ointment. Under a suspicion that he might have worms, a dose of oil of turpentine and castor oil was administered, but no worms came away. On the evening of the twelfth day, when the reading-lamp was brought into the room, he said that he could see the light of it; but on trial, he could not distinguish the finger, or any object held up before him. The next day a dose of senna tea was given instead of the pills; it operated three times, but less abundantly: he said that he could see his fingers. On the following morning he awoke with a smart attack of fever, with quick pulse, dry hot skin, thirst, and headach. A copious evacuation of the bowels soon took place in greater quantity than any preceding one, and very consistent, with numerous lumps of indurated fæces. About mid-day sight was perfectly restored; he saw every object, even as minute as the second hands of a watch. The recovery of vision was permanent, and the patient soon left Edinburgh quite well.[1]

[1] Edinburgh Med. and Surg. Journ. vol. xxiv. p. 64—66.—(Lawrence, p. 554.)

Case 4.—"A child swallowed a small round button, and was soon afterwards deprived of his eye-sight; the parents of the child were, of course, much alarmed at this occurrence, and sought medical relief without delay. A surgeon, who saw the child about twenty-four hours after he had swallowed the foreign body, prescribed a dose of castor oil, directing the friends to repeat it at certain intervals, until the bowels were freely opened, and to notice particularly the evacuations, in order to ascertain whether or not the button was voided. In three days afterwards the mother of the boy brought the button, which had been discharged, and exhibited her child, whose vision was perfectly restored."[1]

Functional derangements of the alimentary canal, inducing considerable irritation, will occasionally, on the application of some apparently inadequate causes, bring on symptoms, resembling, in many of their particulars, acute inflammation of some of the organs contained in the three grand cavities of the body, namely, the head, chest, or abdomen, with amaurotic symptoms more or less developed,—when the head is affected mainly or entirely.

The following is a well developed case of this kind:—

A middle aged female, delicate, and subject to hysteria, had suffered severely from disturbance of the digestive organs, during pregnancy; the bowels being alternately affected with diarrhœa, or constipated. At about the seventh month of utero-gestation, these symptoms became unusually severe, and, at a time when the bowels were obstinately confined, she met with a slight shock in tripping over the last stair, in descending, and, in the course of the afternoon, was still farther excited, by quarreling with her husband. In the evening of the same day, a train of unexpected and alarming symptoms set in; there was intense, excruciating, pulsative headach, increased by assuming the erect posture; great intolerance of light and sound, and the sight imperfect, confused, and dazzling. The commencement of this attack was ushered in by chilliness and shivering, followed by heat of the surface, a rapid, bounding, jerking pulse, deficient however in real power, being readily compressible, and losing even its apparent excitement, by the patient sitting up in the bed, when she became pale, and complained of sensations of syncope. At a later period succeeded violent pain over the whole surface of the abdomen, excessive tenderness, scarcely enduring the weight of the bedclothes; this was increased to perfect agony by slight pressure, which was most violent before the hand fairly reached the surface of the abdomen, and by no means so acute on firm pressure. This pain extended down the posterior and inner side of the thigh, in the course of the sciatic nerve. The tongue was moist, but extensively loaded, and the breath highly offensive. The urine, I may add, was very pale, and secreted in large quantities. From the known condition of this patient's primæ viæ, taken in conjunction with the other

[1] Middlemore's Treatise, vol. ii. p. 348—9.

diagnostic symptoms, the affection was at once attributed to its right source. A moderate dose of rhubarb, with a few grains of calomel, and some aromatic powder, were administered, whilst, at the same time, an enema, with half an ounce of the spiritus terebinthinæ, and twenty drops of tinctura opii, were injected per anum. Abundant, slimy, dark-coloured, and fetid evacuations, in which numerous scybalous masses floated, speedily resulted from their combined operation, and with immediate relief of all the most painful symptoms; and by the next morning, the patient complained only of slight headach, and of the shooting pain in the course of the sciatic nerve. By careful regulation of the diet, and occasional aperients, she perfectly recovered, and, in due time, gave birth to a healthy child, at the full period.[1]

Before quitting the subject of amaurosis from disorder of the brain, I may allude to its production from affections of the spinal cord, either conjointly with such disease of the brain, or as an independent affection quite unconnected with cerebral disturbance.

Experience has without doubt proved the occasional dependence of imperfection or loss of vision solely on spinal disease, but the explanation of such cases is by no means easy. How diseases of parts apparently unconnected in function, such as the spinal cord and retina, can produce abolition of sensation, partial or complete, (amaurosis) of the visual nervous apparatus, is indeed curious; but what is the modus operandi of such exciting, or perhaps rather efficient causes? The anatomical relations of the corpora pyramidalia, corpora olivaria, and corpora restiformia sequently with the anterior, middle, posterior cerebral, and lobes of the cerebellum may, perhaps, explain the propagation of irritation to the origin of the optic nerves, and thus account for what may be called *spinal amaurosis.* The following cases may illustrate these observations: A healthy child was violently convulsed after being attacked with oppression and feverishness for two days, symptoms which subsided after about an hour, leaving her comatose, with distortion of the eyes. She was re-attacked with convulsions, attended with peculiar symptoms, which left her in a comatose condition from which she never recovered. The eye was completely *insensible,* and the pulse very frequent. After severe convulsive attacks death occurred thirty-three hours after the first attack.

Inspection showed only in the brain slight increase of vascularity, and effusion under the arachnoid. The spinal canal being laid open, there was a copious discharge of bloody fluid, and a considerable deposition discovered of a gelatinous colourless fluid betwixt the canal and dura mater, most abundant in the cervical and upper dorsal regions. All the other viscera were healthy. The upper part of the cord itself was slightly softened.

Blindness occurred in the Marquis de Causan from induration of the spinal cord. This disease commenced with pricking in the

[1] See Author, in Lancet, 1839–40, p. 496–7.

fingers and toes of the right side, which gradually extended along the arm and leg: the parts wasted, became cold, and lost their feeling; but some degree of motion was retained. After a twelvemonth the left side became similarly affected, and he then lost all power of motion. His *sight* and hearing next became affected, first weakened, then gradually destroyed. In the same manner he lost his speech and the power of swallowing; and soon afterwards died. The brain and viscera were quite healthy, but the spinal cord included in the cervical vertebræ was so hard as to have the consistence of cartilage; and the membranes of this part red as if inflamed.[1]

CHAPTER VI.

Amaurosis from affections of the Visual Nervous System, Brain, Optic Nerve, and Retina.

Sect. I.—*Amaurosis from an atonic condition of the System.*

Causes which have produced great debility or cachexia of the system, as during convalescence from some severe diseases, are not unfrequently attended by amaurosis, muscæ volitantes, and, sometimes, headach, which gradually disappear as the patient regains his health and strength. It is probable that these amaurotic symptoms depend on anæmia, or on deficient supply of arterial blood to the visual nervous system.[2] Profuse and debilitating evacuations

[1] Abercrombie and Portal.

[2] Anæmia of, or a deficient supply of arterial blood to the visual nervous system, is doubtless a cause of the amaurotic symptoms in some of these cases now under consideration (amaurosis from debility.) But in many this is only one among other, and indeed not slight, pathological conditions of the parts concerned in vision, as well as of the general system: the whole nervous system is, in many of these patients, deranged, disordered, and debilitated; the blood deficient in quantity, deficient in its nutritive constituents—albumen, fibrine, red-particles, and more or less altered, and perhaps contaminated, both in its vital and chemical constituents and constitution; the various secretions and excretions are morbid in quality, and altered in quantity, and one or more organs suffer from impeded performance of function, the result of present or past disease.

But we certainly sometimes see the general appearance and trace the symptoms of anæmia only, in such individuals; they are pale, the prolabia exsangueous, feeble, incapable of exertion, subject to palpitation and syncope, and dyspnœa, especially on exertion; their feet swell, or there may be still more evident symptoms of anasarca present, proving, without doubt, that both the debility and the amaurosis are dependent on one and the same cause—a deficiency in quantity and quality of the circulating and vital fluid, the blood.

or discharges, protracted diseases, or in fact any cause capable of inducing debility, undermining the health, or diminishing or deteriorating the circulating fluid, may induce amaurosis.

The countenance in these cases is, for the most part, pale and bloodless; the prolabia and internal parts of the mouth pallid and exsangueous, and the conjunctiva, and indeed the eye itself, unnaturally blanched and devoid of vascularity; the pupils are dilated, and the irides sluggish in their motions; there is great debility, and, not unfrequently, great excitability of the nervous system; the pulse is weak and small, but frequent, readily compressible, frequently jerking and accompanied by a thrill; the general surface of the body is morbidly pale, and sometimes tumid; the extremities are cold, and the fingers and nails of a livid hue; there is usually headach, vertigo, and noises in the ears, especially on assuming quickly the erect posture, or from abstinence, evacuations, or any debilitating cause; whilst any thing which excites the circulation in the head, or gives tone to the system generally, relieves, and, in a great measure, removes those symptoms, such as stimulants, the recumbent position, moderate exercise, nutritious food, agreeable conversation, tonics, &c.

Beer observes that "the cause of amaurosis very often consists in direct local or general weakness, which may be produced by moral influences capable of agitating the nerves generally, or by real physical commotions of the nerves of the head, more particularly of those belonging to the forehead and eyebrow,—by concussion of the spinal cord,—by a jump from a considerable height with the whole weight of the body coming on the heels,—by concussion of the globe,—even by violent and continued sneezing, and still more by contusions of the eye by blunt instruments. One of the causes to which the greatest influence must be ascribed in the production of amaurosis, is the serious direct weakness induced by loss of fluids; as in cholera, continued diarrhœa,—in salivation, not forgetting the copious spitting of the tobacco smokers, who in modern times pursue their unmannerly practice in all places,—in hemorrhages,—in paracentesis abdominis when incautiously performed,—in the loss of seminal fluid from excessive venery, nocturnal pollutions or onanism, and in the abuse of issues. General debility, capable of exercising a very prejudicial influence on the nervous structures of the eye, may be induced by other directly weakening causes; for instance, long and bitter affliction, continued vexation, incessant weeping, with constant anxiety about the means of subsistence, particularly if the diet be unwholesome, long fasting and watching, sudden and violent fright, inconsiderate washing and bathing the eyes with very cold water, particularly when they are already weak and irritable, long residence in dark dwellings, especially in the exercise of occupations which strain the eyes, a cause very common in Vienna. The amaurosis occasionally seen at the end of typhus, without headach, or any signs of excitement in the eyes, and occurring, according to my experience, only after

the pure and not the contagious nervous fever, must be regarded merely as a symptom of the general weakness: and this view is supported by the method of treatment, which consists simply in directing a suitable plan of diet."[1]

A frequent cause of the amaurosis from debility is undue lactation, which, as Dr. M. Hall observes, is not necessarily protracted lactation, since some females never recover their strength after their confinement, from the exhausting influence of suckling. "Many are incapable of nursing longer than three or four months, when the symptoms of undue lactation begin to show themselves."

The first effect of undue lactation is a gradual loss of the power of the whole system. Dyspeptic symptoms soon begin to show themselves; the stomach is unable to digest the usual quantity of food; there is flatulence, acidity, cardialgia, constipation alternating in advanced cases with diarrhœa, then imperfect sanguification and its results, imperfect nutrition, paleness, thinness, and nervousness.

Amaurotic symptoms succeed to this condition of the system, with affections of the head, heart, lungs, and uterus.

Treatment.—The first necessary step in the treatment of this form of amaurosis, is to remove the exciting cause, when possible. The exciting cause being removed, our object is to give tone to the system, and remove any complications which would retard the convalescence.

The diet should be mild and nutritious, calculated to increase the strength of the system, and at the same time not too much nor too powerful for the digestive powers. Dr. Billing observes that "medicines and dietetic directions sometimes fail merely from being too energetic. Thus, a child aged eight was very pale and wasting, with no evidence of disease except total loss of appetite, which had ensued after mild scarlatina. She had slight swelling of the submaxillary gland, but could not be called strumous. A medical friend who saw her, prescribed animal food and fermented liquor, compound infusion of gentian, with a little quinine, and gently laxative doses of calomel and rhubarb, as the bowels did not act. Finding in a week that she was no better, and annoyed with flatulence and acidity in addition, he consulted me.

"The prescription was excellent, could it have been borne, but there was too much debility of the mucous membrane and glands of the primæ viæ, therefore a milder medicine and diet were indicated, viz. half an ounce of decoction of hœmatoxylon, with an equal quantity of chalk mixture to counteract the acidity and flatulence, and half a dram of Epsom-salts to keep up the peristaltic action, three times in the twenty-four hours, and a diet of the animal food made into a strong soup, with milk and bread. In ten days this produced appetite and digestion, and then she was able to resume the medicine and diet at first prescribed, which soon perfected her cure."[2]

[1] Lehre, vol. ii. p. 449, 450. [2] Princip. of Med. p. 169.

Tonics are to be used, simple, or combined according to the peculiarity of the case; the vegetable bitters, quinine, or metallic tonics, the preparations of iron, zinc, &c. Antispasmodic and stimulant medicines, as compound galbanum pill, valerian, ammonia, &c., are frequently necessary to calm the excited nervous system.

It is of the greatest importance to attend to the state of the digestive organs, and to the regular evacuation of the bowels by purgatives with tonics, sometimes with cordials. Moreover the patient should use exercise in the open air, and when there is sufficient reactive power present, the cold bath, or cold sponging, followed up by brisk friction with a coarse towel; the feet should be kept warm, and the mind occupied.

Local measures.—Blisters should be applied in succession behind the ears, or to the back of the neck, or we may use issues, setons, or the tartar emetic ointment. Local stimuli, as recommended by Mr. Ware, are to be applied to the conjunctiva, a little liquor ammoniæ, or sulphuric ether being poured into the palm of the hand and held under the eyes, two or three times a-day. Should the amaurosis resist these measures, it would afford a favourable opportunity for the endermic application of strychnia, and the use of electricity or galvanism.

Case 1.—*Debility, producing amaurosis from the excessive employment of tobacco.*—"Lieutenant * * *, young officer of dragoons, applied to me," says Mr. Curtis, "in consequence of a decidedly amaurotic affection. His sight was so imperfect that he could not perceive small objects even when near him. He informed me he had been in this state nearly three months, and that he was daily getting worse. The disease was attended with great debility and emaciation. He was, he said, unable to account for its origin; but on further inquiry, I discovered he was in the habit of smoking cigars and tobacco to such an excess, that he had brought on a spitting almost amounting to ptyalism: he was what is called an amateur, and to support his pretensions to this enviable distinction, used frequently to begin smoking soon after breakfast, and continue this pernicious custom during half the day without intermission. With much persuasion, I prevailed on him to leave off this silly modern accomplishment; though I had great difficulty in convincing him that this was the true cause of his disease. He, however, did abandon it; and by so doing, and taking a little tonic medicine, his sight is now perfectly restored, and his health regained."[1]

Case 2.—*Complete amaurosis caused by suckling.*—"E. N., twenty-five years of age, of slender make, fair skin, and red hair, who had been married a year and a half, had brought forth her first child four months before I first saw her, which was in the middle of June, 1830. She suckled the child, which was strong and took the breast very frequently: her milk was abundant.

[1] Curtis's Treatise on the Eye, p. 233–4.

Lately she had begun to feel very weak; she could not lift a weight, and she cried frequently without having any reason for uneasiness or complaint. Being totally blind, she was led to my house by a friend. She was pallid, and had a small feeble pulse. The pupils were in the middle state, and the irides moved slightly. The retinæ were completely insensible; she could not discern the situation of the window, nor see a lighted candle held close to her. I directed her to wean the child, to drink porter, and take the sulphate of quinine. In a few days, as sight did not improve, I ordered a blister to the nape, and afterwards friction of the tartar emetic ointment in the same situation. When the latter began to produce its effect, the sight mended. On the 2d of July, she could see nearly all objects, but was unable to read: the motions of the iris and the pupil were natural. (To leave off the quinine; four grains of Plummer's pill every night; a draught of infusion of rhubarb, with compound decoction of aloes daily.)

"16th July.—The pills have been increased to two daily; the health and strength are good; the irides act well, and the pupils are natural. Sight is improved: she can see the large letters over doors, but is unable to distinguish even the capitals of print. As this patient found herself improving, she did not return to me for some time, but continued her medicines. When I saw her in November, she had long left off all treatment, and had resumed her usual active occupations. Her health and strength were good; the sight was completely restored, and she read to me the smallest print with facility."[1]

Case 3.—Mrs. S. was confined in her thirtieth year, and, being a woman of a healthy constitution, suckled the child herself. She did this for some time, without feeling any inconvenience from it; but after six weeks her strength began to fail, and continued to decline daily, till she was unable to move about the house without experiencing a very painful languor. Her sight began to fail about the same time; at first only in a slight degree, but subsequently so considerably, that the full glare of the mid-day sun appeared to her no more than the light of the moon. At this time, no black specks were perceived by either eye, nor did objects appear at any time covered with a mist or cloud. She had a violent pain in the neck, running upwards to the side of the head; and, on this account, the person who attended her thought proper to remove four ounces of blood by cupping, from the part first affected. After this, her vision was worse than before, and shortly afterwards she became completely amaurotic in both eyes.

After she had been in this state of blindness three days, Mr. Wathen was first desired to see her. He found both pupils widely dilated, and insensible to the brightest light. His first advice was, that the child should be weaned without loss of time. He directed bark draughts to be taken by the mother three times a day, and an

[1] Lawrence's Treat., p. 558, 9.

occasional aperient, on account of a costive habit of body, to which she had been almost constantly subject ever since the time of her delivery. To the use of these remedies was added the application of the vapour of ether to the eyes and forehead frequently.

Four days after the commencement of this treatment, Mr. Ware visited the patient with Mr. Wathen.

She seemed to be somewhat better, and could even perceive some faint glimmerings of light, although the pupils of both eyes were still as dilated and motionless as before. The bark and the ether were continued, and the next day a powerful stream of electricity was poured on the eyes, and several small sparks were drawn from the forehead and temples. On the day after this the patient was placed on a glass-legged stool, to increase the electric power, and the same experiments repeated. This appeared to have considerable influence in the promotion of the cure. The first trial was almost immediately followed by such a degree of amendment, that the patient, to whom all objects had before been confused, could now distinguish clearly how many windows there were in the room where she sat, though she was still unable to make out the frames of any of them. On the third day, soon after she had been electrified, the catamenial flux came on for the first time since her confinement, and continued three days, during which both the bark and electricity were suspended. Immediately after this they were resumed, and the sight mended daily. At the end of a week, she could perceive all large objects; and soon after she could read even the smallest print. Her strength, indeed, did not return so quickly; and on that account she was advised to go into the country, where she quickly regained perfect health, from the change of air and a mild nutritious diet.[1]

In some cases the closest resemblance exists between the amaurosis from debility, and that arising from cerebral disease.

Mr. Tyrrell gives the following case: "A young and delicate female, about seventeen years of age, having great nervous susceptibility, and disposed to hysteria, was accidentally thrown from a gig with her father, who was a very large man. She fell upon her father, and was taken up without any mark of injury; she was, however, dreadfully alarmed, and soon after attacked with a violent fit of hysteria: several hours elapsed before she could be roused from this under the use of the ordinary treatment, by stimuli, antispasmodics, &c. She then complained of excessive headach, giddiness, confused vision, and heat of head; the stomach was irritable; she suffered from great mental depression, and could not procure sleep. Whilst in this state her medical attendant (believing that she had received some concussion of brain by her fall) bled her: she fainted after the loss of about eight ounces of blood, and remained a long time in a condition approaching syncope. In a few hours afterwards, her previous symptoms were renewed and

[1] Ware's Observations on the Cataract and Gutta Serena, p. 385.

became much aggravated, the headach almost intolerable, the depression excessive, and the affection of vision increased, so that in forty-eight hours after the venesection she could not discern light. A few hours after the amaurosis was complete, she was brought to me, still labouring under the symptoms last mentioned; but, in addition, I found her pallid, with cold extremities, and a quick, feeble, and easily compressible pulse; the result of the abstraction of blood was sufficiently indicative of the nature of the affection, and, to prove its asthenic character. I directed perfect quiet, the recumbent posture; small portions of nutritious matter to be given frequently, ten drops of the vinum ferri to be taken in weak wine-and-water every four hours, and an occasional dose of the compound decoction of aloes with manna, and a few drops of the aromatic spirit of ammonia, as an aperient. In forty-eight hours from the time I prescribed for her, her symptoms were greatly mitigated, and she began to perceive light again; she soon recovered her ordinary condition of health, and lost her headach, feeling of depression, &c., but the functions of the retina returned very gradually; so that several weeks elapsed before she could tell the letters in the title-page of a common octavo work; being so far restored, I lost all knowledge of her for several months, when she was again brought to me nearly in the same state as when I first saw her; her father had failed in business, and she had suffered much from anxiety and privation, and had neglected all treatment. I put her under the same plan of treatment again, gradually increasing the dose of steel, and occasionally varying the form of medicine; her health was rapidly re-established, and a very slow improvement took place in vision; but after many months' careful perseverance in the above means, she obtained only sufficient vision to be able to make out a large print. I subsequently tried blistering, electricity, galvanism, and strychnine, but without any further benefit.

"Connecting the early symptoms of this case with the fall, many medical men would probably have treated it in the onset in the same way. Had there been a careful examination of the pulse and circulation, and had the condition of these been carefully viewed with the other symptoms, it would have been perceived that the cerebral symptoms could not be depending upon excess of vascular action; the pulse which exists, in cases of cerebral mischief from injury, is either quick, sharp, and incompressible, or slow, laboured, and of moderate force. I have never found, under such circumstances, the quick, feeble, and easily compressible pulse, which occurs in most asthenic diseases."[1]

On the other hand, there is sometimes much difficulty in discriminating cases in which the amaurosis is produced by cerebral organic mischief from the asthenic cases.

Case 5.—"A lady, about forty years of age, became the subject

[1] Cyc. of Pract. Sur. vol. i. p. 102.

of amaurosis, nearly complete in one eye, and imperfect in the other, a few weeks after miscarriage, during which (it was stated) she lost a large quantity of blood: the amaurosis had been rather rapid in its progress. She was brought to London after several weeks had elapsed, and she had undergone rather active treatment by cupping and mercurials principally; leeches and blisters had also been used, but the disease had advanced. I was requested to see her, and found her very pallid, with cold extremities, feeble, rather quick and compressible pulse, great despondency, and prostration; slight strabismus existed; the right eye-ball projected rather more than the left, and its usual power was almost gone; the left eye retained sufficient power to distinguish large objects,—the pupils were dilated and fixed; a degree of numbness and loss of muscular power affected one side of the face: she suffered from constant dull headach, which was relieved in a degree when she assumed the recumbent position. The general symptoms and non-effect of depletory treatment connected with the history of the case, especially the circumstance of large loss of red blood, gave it the character of asthenic disease, whilst the strabismus and partial paralysis of face created strong suspicions of some organic cerebral disease. I considered that there might be some partial serous effusion or softening about the brain, to account for the last mentioned symptoms, and yet the case be one of asthenic kind, for I have no doubt that organic changes can and do take place, and often with frightful rapidity, when the general power is much below par. Under this conviction I prescribed much as in the last mentioned case, and was deceived by some degree of improvement, for she became easier, and had more animation about her. After a short time, however, she again began to decline, and in a few weeks died, with more evident symptoms of serious cerebral disease. On post-mortem examination a large abscess was found in the left hemisphere of the cerebrum, extending into the anterior and middle lobes. I believe that the suppuration had commenced before I saw her, and that medical or surgical skill could have availed little, even with correct diagnosis. This, however, does not lessen the interest of the case, which presented a train of symptoms extremely complex, and which could very rarely be observed again. The patient was not in a state to give me any detailed account of her early symptoms, and the statement received from her medical attendant in the country was little more than a history of the treatment that he had adopted."[1]

[1] Tyrrell, loc. cit. p. 103, 104.

Sect. II.—*Amaurosis from Anæmia of the Visual Nervous Structures, from Loss of Blood.*

Amaurosis is one of the effects of bleeding to syncope; the patient first experiences a degree of vertigo, succeeded by loss of consciousness, noises in the ears, dimness of vision, and at length, when syncope approaches, complete amaurosis; the respiration is affected, becoming short and laborious, with deepdrawn sighs, and, lastly, is entirely suspended. After a time, the painful sensation rouses the patient, when the sighing breathing is repeated, and then becomes suspended as before. The entire surface of the body becomes pale, cold, and covered with profuse cool perspiration; the stomach is frequently affected with vomiting, or eructation; the action of the heart and arteries is subdued, and, during syncope, is suspended in the extremities. The patient, on recovering, experiences, perhaps, a momentary delirium, yawning, irregular suspirious breathing, and then a return of consciousness, sight, and a gradual restoration of the strength of the pulse.

In young and healthy individuals, a state of reaction is frequently the consequence of a protracted drain of blood. "This state," says Dr. Marshall Hall, "of excessive reaction, is formed gradually, and consists, at first, in forcible beating of the pulse, of the carotids, and of the heart, accompanied by a sense of throbbing in the head, of palpitation of the heart, and eventually, perhaps, of beating or throbbing in the scrobiculus cordis, and in the course of the aorta. This state of reaction is augmented, occasionally, by a turbulent dream, mental agitation, or bodily exertion. At other times it is modified by a temporary faintness, or syncope. There is also sometimes irregularity of the beat of the heart and of the pulse.

"In the more exquisite cases of reaction, the symptoms are still more strongly marked, and demand a fuller description.

"The beating of the temples is at length accompanied by a throbbing pain of the head, and the energies and sensibilities of the brain are morbidly augmented; sometimes there is intolerance of light," (and amaurosis) "but still more frequently intolerance of noise, and of disturbance of any kind, requiring stillness to be strictly enjoined, the knockers to be tied, and straw to be strewed along the pavement; the sleep is agitated and disturbed by frightful dreams, and the patient is liable to awake, or be awoke, in a state of great hurry of mind, sometimes almost approaching to delirium; sometimes there is slight delirium, and occasionally even continued delirium; more frequently there are great noises in the head, as of singing, of crackers, of a storm, or of cataract; in some instances there are flashes of light; sometimes there is a sense of great pressure or tightness in one part, or round the head, as if the skull were pressed by an iron nail, or bound by an iron hoop."

The action of the heart and arteries is increased; the pulse varies from 109 to 120 or 130, and is attended by a forcible jerk or

bounding of the artery. The respiration is generally frequent and hurried, and the patient requires the smelling-bottle, fan, and fresh air.

The skin is sometimes hot; and there are frequently great hurry and restlessness.

The following case strikingly illustrates the phenomena of reaction, from a continued drain or loss of blood.

Case 1.—Mrs. – , aged twenty-eight, of a stout constitution. After delivery, there was uterine hæmorrhagy, which continued to recur for the twelve subsequent months. It was then discovered that Mrs. —— laboured under polypus uteri; a ligature was applied, purgative medicines given, and the patient recovered. The effect of this loss of blood followed, however, and there were, 1. Beating of the temples, a sense of violent "knocking" in the head, pain, vertigo, dimness of sight, and singing in the ears, terrific dreams, and starting from sleep;—2. Frequency of the pulse, pulsation of the carotids and aorta, fluttering and beating of the heart, faintishness, and a sense and fear of dissolution,—the palpitation of the heart was sometimes such, on awaking, as even to move the bed-clothes, the bed, and, it is said, even the door;—3. The breathing was short and hurried, sometimes with panting, sometimes with sighing.—There were urgent calls for air, for opened windows, and the smelling-bottle, and the nostrils and temples were required to be bathed with sal volatile, or vinegar.

The countenance, prolabia, and tongue, were pallid; the legs somewhat œdematous; the bowels were irregular, the secretions morbid; once there was obstinate constipation; frequently the bowels were merely confined; sometimes with sickness, but always with an increase of all the symptoms.[1]

Case 2.—*Exhaustion, with coma, amaurosis, and finally sudden sinking.*—"An opulent farmer, nearly sixty years of age, tall and well formed, of active habits in the early part of life, mostly of the sanguineous temperament, and of the bilious diathesis, was affected with hereditary gout at an early period of life, and had continued to be a martyr to that disease. He had, for many years, been occasionally affected with internal spasm in the cardiac region, attended with urgent sickness and giddiness—that form of complaint, namely, which is commonly called gouty spasm of the stomach. The biliary system was sometimes so much deranged as to give rise to jaundice. He had more than once been attacked with pneumonia, which was always sufficiently active to require one or more general bleedings.

"About five months before the fatal event which I have to describe, he was seized with apoplectic symptoms. He was saved from death by prompt treatment by bleeding and purgatives. From this time, however, his health became wholly unsettled, and his frame evidently enfeebled. In the beginning of summer he was

[1] Observations on Blood-letting, by Dr. M. Hall, p. 29—33.

occasionally affected with sub-acute gout, both in the upper and lower limbs, and also with lumbago. Cramps and jactitations prevailed much in these attacks; the depression of his spirits was extreme; the tone of the nervous system was in every way reduced.

"After exposure in an open carriage, on one fine day, with the wind in the east, he was suddenly attacked with a severe pain in the abdomen, chiefly in the right hypochondrium and towards the stomach, the respiration being at the same time exceedingly painful and laboured. His medical attendant viewed the disease as acute hepatitis, and bled him profusely from the arm, and with immediate relief, which was rendered more complete by the free action of purgative medicines. There was a slight recurrence of the symptoms in the course of forty-eight hours, and large depletion from the vessels was again practised, so that at the end of three days, nearly seventy ounces of blood had been abstracted by means of the lancet, cupping, and leeches.

"When the reporter of this case first saw this patient, the state of the vital powers was seriously depressed. The patient appeared bloodless, and cadaverously pale. The superficial veins everywhere had the look of being quite empty. The tongue was pale, and coated with brown fur, the saliva was abundant, but extremely viscid; the eyes were glassy, the pupils dilated, the sight imperfect, the voice was very feeble; there was much subsultus tendinum; the senses occasionally wandered, there was a lethargic state without any refreshing sleep; on the contrary, there was much restlessness: the jactitation of the limbs was considerable, the respiration, when the eyes were closed, was noisy, and distinguished in a great degree by puffing, as a smoker puffs out the smoke from his pipe. The pulse ranged from 100 to 120, and was truly the irritable pulse; it was throbbing, and also attended with a jerk. His pulse, in health, was known to be about 66.

"The treatment had in every way been strictly antiphlogistic; the diet being confined to gruel, barley-water, and tea. At this juncture it appeared imperative to change the regimen. The patient had a frequent disposition to faint, and actually appeared sinking into death. Cordial nourishment, as gruel and brandy, eggs, wine, beef-tea, &c. were administered with caution. The former fluids had been rejected from the stomach, but the cordials just mentioned were retained. Cordial medicines were also given; in the first instance a volatile saline draught with cordial confection; and due attention was paid to the bowels.

"The powers of the patient were soon revived, and in a few days acquired a remarkable degree of improvement. After a short time, he was enabled to take airings in a carriage daily, but still there was no promising convalescence. The pulse never fell below 90, and continued bounding; there was an increasing lethargy, and in sleep the respiration was attended with the puffing. Subsultus tendinum continued to prevail.

"At the end of a month from the time of the first attack, the

unfortunate patient became suddenly seized with stertorous breathing, while in the act of taking some nourishment. The muscles of the face were distorted, all the superficial vessels of the head and neck were instantly distended, and in less than two minutes death closed the scene.

"No examination of the body was permitted."[1]

"The amaurosis," says Mr. Travers, "from depletion, is sometimes mistaken for its opposite, viz. that from plethoric congestion; this is owing to the coincidence of a dilated and immoveable pupil, muscæ, and a deep-seated pain in the head, with occasional vertigo; and its occurrence often in a corpulent habit. It succeeds somewhat abruptly to uterine floodings, and large and sudden depletion for acute diseases. The pain is not confined to the region of the orbit, though it affects chiefly, if not exclusively, the same side of the head; it is that peculiar nervous pain to which women are subject after uterine hemorrhage, attended with a sense of defined pressure, as of an iron finger on the brain; and sometimes a distressing jarring noise, like that of a mill or threshing-floor, or the rattling of the shingles as a heavy wave of the sea recedes. It is perhaps connected with an imperfect injection of the medullary substance. By a cautious use of tonics it is relieved; by whatever lowers or stimulates, whether diet or medicine, it is decidedly aggravated. The vision in this form of amaurosis is further enfeebled by the loss of as much blood as flows from two or three leech-bites. This is not imaginary; I have seen distinctly marked cases of it, in which large and copious venesection was still urged as the only resource of art. This I consider to be a fatal mistake."[2]

Symptoms closely resembling hydrocephalus frequently occur in children from excessive evacuations or debilitating circumstances, which are accompanied by dilated pupils and blindness, frequently with strabismus.

"It is a law in pathology," remarks M. Andral, "that, in every organ, the diminution of the quantity of blood which normally it should contain, produces functional disturbances, as well as the presence of an excessive quantity of blood. And what is more, in both cases these functional disturbances are precisely similar."[3]

In cases of amaurosis arising from the excessive loss of blood, the retina, optic nerve and brain receive an imperfect supply of arterial blood; they are in a state of anæmia, and the vessels adapt themselves to the diminished supply, and consequently the visual function is interfered with. It is probable, however, that the actual quantity of blood contained in the cranium cannot materially be either increased or diminished, consequently it accumulates in the veins, on which the arteries act with a diminished momentum. Dr. Abercrombie observes that "it is probably in this manner that

[1] Dr. M. Hall's Obs. on Blood-letting, p. 65—69.
[2] Travers' Synopsis of Diseases of the Eye, p. 160.
[3] Andral's Clin. Med. Trans. by Dr. Spillan, p. 91.

there arises the appearance of congestion in the superficial veins of the brain, which has been observed in animals that have bled to death; and many curious facts occur to us in practice, which appear to be referable to a derangement of the circulation in the brain, which can only be accounted for in this manner."

The hydrencephaloid symptoms of children, arising from exhaustion, are probably the result of this disordered circulation within the cranium.

"A little girl, about two years old, small of her age, and very delicate, was taken ill with the symptoms which I have above described (the symptoms of the hydrencephaloid disease). She lay dosing, languid, with a cold skin, and a pulse rather weak, but not much quicker than natural. She had no disposition to take nourishment. Her sister having died only a week before of an illness which began exactly in the same way, and which was treated by leeches and purgatives, and some doubts having been entertained by the medical attendant of the propriety of the treatment, leeches were withheld, but the child not being better at the end of two days, the parents, naturally anxious about their only surviving child, consulted another practitioner. The case was immediately decided to be one of cerebral congestion, and three leeches were ordered to be applied to the head. As the nurse was going to apply them, and during the absence of the medical attendants, a friend called in who had been educated for physic, but had never practised it, and who had great influence with the family: he saw the child, said that the doctors were not sufficiently active, and advised the number of leeches to be doubled. Six, therefore, were applied; they bled copiously; but when the medical attendants assembled in the evening, they found the aspect of the case totally altered, and that for the worse: the child was deathly pale, it had scarcely any pulse, its skin was cold, the pupils were dilated and motionless when light was allowed to fall on them, and when a watch was held to its eyes it seemed not to see; there was no squinting. Did this state of vision depend on the pressure of a fluid effused into the brain since the bleeding, and during this exhausted and feeble state of circulation? or did it depend on the circulation of the brain being too languid to support the sensibility of the retina? It is well known that large losses of blood enfeeble vision. I saw a striking instance of this in a lady who flooded to death. When I entered the chamber she had no pulse, and she was tossing about in that restless state which is so fatal a sign in these terrific cases. She could still speak, asked whether I was come, (she knew I had been sent for,) and said, "Am I in any danger? How dark the room is! —I can't see." The shutters were open, the blind up, and the light from the window facing the bed fell strong on her face. I had the curiosity to lift the lid, and observe the state of the eye; the pupil was completely dilated, and perfectly motionless, though the light fell strong on it. Who can doubt that here the insensibility of the retina depended on the deficiency of its circulation? But to return

to the little patient. The next day she had vomited her food several times; it was, therefore, directed that she should take no other nutriment than a desert spoonful of ass's milk every hour, and this was strictly obeyed, and continued for several days. The child wasted, her features grew sharp, and every now and then she looked fretful, and uttered a faint squeaking cry; the eye-balls became sunk in the socket, like those of a corpse that had been dead a month; the skin continued cool, and often cold, and the pulse weak, tremulous, and sometimes scarcely to be felt. Under this regimen, and in this way, she continued to go on for several days. At times she revived a little, so as to induce those who prescribed this treatment to believe confidently that she would recover, and she clearly regained her sight, for if a watch was held up to her she would follow it with her eyes. She lived longer than I expected, a full week, and then died with the symptoms of exhaustion, not with those of oppressed brain. The head was opened by a surgeon accustomed to anatomical examinations, and nothing was found but a little more serum than is usual in the ventricles.

"If the reader has perused the foregoing case attentively, and has reflected on it, he will of course draw his own inferences. I can draw no other than these, that the heaviness of head and drowsiness, which were attributed to congestion in the brain, really depended on a deficiency of nervous energy; that the bleeding and scanty diet aggravated this state, and insured the death of the child; also, that the state of the eye which so speedily followed the loss of blood, and which resembled that occasioned by effusion, did in reality depend on a deficiency in the circulation of the brain, a fact of considerable curiosity and importance."[1]

[1] Dr. Gooch on some of the most important diseases peculiar to women.

That amaurosis is occasionally one of the symptoms of the simulated hydrocephalus or hydrencephaloid affection of infants,—a condition of the nervous system which results from exhaustion, however produced,—the narration of the following cases will abundantly prove. The first was in a little boy, in whom it occurred in an extreme form, under the care of Dr. M. Hall, followed however by perfect recovery.

The patient was a little boy, aged 4, who during the progress of the symptoms became comatose, and perfectly blind and deaf. The finger might approach the half closed eye, without inducing any movement; but the moment it touched the eye-lash, the eye-lids closed. A spoon applied to the lips excited their action, and the fluid it contained was conveyed into the pharynx and swallowed. The respiration was frequently suspended; a sigh and frequent respiration followed. The cerebral functions had ceased; the true spinal functions remained! (Lectures on the Nervous System, p. 68.)

The second case took place under my own notice, and came on from the employment of antiphlogistic remedies in acute bronchitis, which occurred in an infant; the remedies proving quite successful, as regards the inflammation, but inducing exhaustion, followed by restlessness, then a comatose condition, with blindness, and dilated and immoveable pupils.

An infant, not a twelvemonth old, became affected with acute bronchitis: the symptoms being accelerated and laborious breathing, aggravated in

Sect. III.—*Amaurosis from Hyperæmia of the Visual Nervous Structures.*[1]

Hyperæmia of the visual nervous system, producing amaurosis, may result from general plethora, venous congestion, or irregular local determination. "A loss of balance in the sanguiferous system," says Mr. Travers, "occasioning an undue determination of blood to the head, often exists, distinct from general plethora, and is aggravated by loss of blood. Cases of undue determination of the blood to the organ are especially common after deep-seated chronic inflammation, or distress from over-excitement, by which vessels have lost their tone; an effect decidedly increased by depletion.

"The following case is an example:—

"A young medical man came to me one morning from the country in extreme anxiety, with an earnest solicitation that I would instantly apply a ligature to his carotid artery. This gentleman, aged 25, was of short stature, and constitutionally healthy. His pupils were large, and his countenance was suffused, and bore the appearance of preternatural determination of blood to the head. He had been the subject of two attacks of inflammation; one in

paroxysms; cough suffocating and very severe; fever increasing at night; the chest sonorous, mucous crepitation (large crepitation distinct every where in both lungs.) Leeches were applied, and tartar emetic given internally, the feet placed in hot water, &c.

The inflammatory symptoms were subdued; the respiration regained its normal condition; the cough ceased in great measure; the fever subsided; and all other circumstances promised fair towards a speedy and happy recovery.

But soon other phenomena of opposite indications developed themselves: the child became restless, moaned continually, sometimes lay quiet and semi-comatose, at others was remarkably peevish and irritable. These periods of irritability became less and less: the infant lay pale, cold, comatose, but continually without sleep, in its mother's arms; the pulse was very rapid, small, and feeble; the pupils dilated, not acting by bringing a lighted candle near the eyes; the features collapsed, pale, and indicative of exhaustion; the moaning continued.

Rapid recovery took place under the employment of stimulants, nutritious food, and very minute doses of laudanum. (Lancet, vol. i. 1839—1840, p. 758, 759.)

[1] In the following section I have considered the amaurosis which results from hyperæmia of the visual nervous system generally, however produced; thus combining those cases which occur in full plethoric habits, from excess in the quantity and alteration of the quality of the blood, denoted by an exuberance of health; and those forms of passive congestion which so frequently occur in debilitated constitutions, the result of the advanced forms of relative plethora or imperfect purification of the circulating fluid, or from some local cause, as the consequence of repeated inflammations or impeded return of venous blood from the head. I have, however, made a division in their consideration, and given some of the peculiar local symptoms of each variety, and its appropriate treatment.

April, the other in October of the same year; during which he lost upwards of an hundred ounces of blood. He had now a constant heavy pain in the head, chiefly over the coronal suture, and in the direction of the sinuses, with tinnitus of the left ear. After stooping, the giddiness was extreme, and a golden coloured spot, edged with black, appeared floating before the eye. He had been troubled with muscæ in excess for a year and a half past; he had now fire-sparks flashing before the sight, and saw a pulse in the choroid synchronous with that of the wrist. When looking at near objects he was not troubled with muscæ; but they were always numerous, in proportion as the object was remote. He did not complain of much dimness. His complaints were not relieved by topical blood-letting. He recovered gradually but perfectly, under a regulated diet, and a course of the blue pill with saline aperients."[1]

Symptoms.—The amaurosis in plethoric individuals is accompanied with severe headach, which is generally beating or pulsative, and felt chiefly in the forehead and temples,—vertigo, photopsia or muscæ volitantes, all of which are much increased by stooping; the pulse is full, strong, and morbidly frequent; the countenance flushed, the head hot, and the body full; there are not unfrequently noises in the ears; he is heavy and indisposed for any exertion, bodily or mental, frequently sleepy.

In the local determination which occurs in delicate individuals, who are far from plethoric, or suffer only from relative plethora or excrementitious redundancy; the headach is dull and oppressive,—a sense of weight without much pain. The countenance of the patient is expressive of the oppression and dulness he complains of, and there is usually stupor, heaviness, noises in the ears, giddiness, and sleepiness; his sleep is generally heavy, sound, and snoring, sometimes restless, and disturbed by dreams. The patient's countenance is usually bloated, livid, or pallid; his pulse weak, compressible, slow, in some cases accelerated; his spirits are low, and he is nervous and hypochondriacal.

All his symptoms, but especially the giddiness, are increased by stooping, or by looking upwards or downwards from a height.

The amaurotic symptoms are developed, in general, gradually; the sclerotical and conjunctival vessels are more apparent than natural, the eyes are slightly protruded, and sometimes a sensation of throbbing is felt in them. The pupil, in the first instance, is slightly contracted, but as vision becomes more and more imperfect, so the iris dilates and its motions become more and more limited and sluggish.

Causes.—The most frequent causes of amaurosis from hyperæmia are indulgence in the pleasures of the table, excess in malt liquors, sedentary habits, constipated bowels, diseases of the heart or lungs impeding the free return of blood from the head, tight neck-cloths, too low a position of the head during sleep, disorders

[1] Travers' Synopsis of the Diseases of the Eye, p. 158, 159.

of the digestive organs, intense and prolonged study, suppression of any accustomed evacuations, as epistaxis, the catamenia, the hemorrhoidal discharge, drying up of old ulcers accustomed to discharge freely, and wearing the hair too long.

Dr. C. Mansfield Clark remarks that "women who in the middle of life indulge much in the pleasures of the table, (particularly if they drink too freely of wine or spirits,) whose habits of life are sedentary, and who take very little exercise in the open air, are liable to become suddenly corpulent. They form a larger quantity of blood, as may be known by attending to the blood-vessels. The pulse becomes full, and the superficial vessels, which were hardly visible before, become in different parts of the body so large as to be easily traced by the naked eye. This may be remarked upon the cheeks. Such women are generally weak, although they may have the appearance of strength; they can take very little exercise without fatigue, and are overcome by a very moderate degree of exertion; the habits which at one time were sedentary by choice, become so now from necessity; for the woman neither possesses energy enough to exert herself, nor, if she has the inclination, can she indulge it, from the inconveniences attending such exertion.

"In many of these cases a slow enlargement of the liver takes place, which may be felt by applying the hand to the side. Generally a very small quantity of bile is mixed with the stools; and sometimes these become not only of a clay-colour, but perfectly white. The fetor is usually greater than that of the alvine excretions generally, and it resembles more the odour of putrefaction than that of fæces. As the quantity of bile which passes into the bowels becomes smaller, the woman becomes more and more constipated, and the obesity increases. The vaginal discharge increases in quantity; the fluid of menstruation also is secreted more plentifully; the interval between the periods are generally shorter than natural: and these symptoms for the most part lead the patient to apply for professional advice. Upon inquiry, it will be found that fits of giddiness and of sleepiness have attacked the woman; that there has been pain in the head, perhaps indistinct vision, such as a waving appearance when the eyes are open, or a sensation of sparks when they are closed. These symptoms are sometimes relieved by spontaneous bleeding from the nose. In this way the case proceeds, in some instances disregarded by the woman, until the urgency of the symptoms demands attention.

"Many years may elapse before any danger is apprehended; and then all at once the woman may be attacked by a fit of apoplexy, or by some great internal hemorrhage, which may quickly destroy her; or she may gradually become weaker and dropsical, and at length die. The symptoms will be diminished after each period of menstruation. The mucous discharge is probably, in some degree, useful; hence, if a check be given to it without employing any means of unloading the blood-vessels, the violence of the symptoms generally increases.

"The objects in the treatment of this case are, to unload the vessels, by removing at once a large quantity of blood; to prevent its too quick formation in future; to restore, if possible, the liver to a healthy state; afterwards to moderate the vaginal discharge, or to diminish the inconveniences attending its continuance; and lastly, to lay down proper rules for the patient's conduct, in order to prevent a return of the symptoms."[1]

Treatment.—When the amaurosis depends on general plethora the treatment must be decidedly antiphlogistic; blood-letting general and local, in such quantities, and as frequently repeated as the peculiarities of the case shall indicate, active purgation, abstinence, and abundant exercise. In the more asthenic cases of congestion, local blood-letting only is admissible, and in many cases even that is injurious; mild aperients, sometimes with tonics or cordials, gentle exercise, and country air. The head in all cases should be kept cool, and stimulating pediluvia may be employed frequently; in some cases the shower bath or cold spunging, some efficient mode of counter-irritation by blisters, or a permanent drain, according to circumstances. In many cases it is necessary to have recourse to mercury so as to affect the gums mildly, while every means in our power is exerted to remove any exciting cause, and to restore the general health.

Case 2.—*Complete amaurosis, produced suddenly by sensorial congestion.*—"A patient in St. Bartholomew's Hospital, about thirty years of age, with enlargement of the testicle, had been directed to rub a little mercurial liniment on the part daily; and had done this four or five times, when salivation occurred. He felt indisposed in the evening of Saturday, but went to bed without making any complaint. He awoke in the middle of the night with great pain in the head; and feeling very ill, he got up, and thought that the candle, usually kept burning during the night, had gone out, for he could not see it; in fact, his sight, which had been perfect when he went to bed, was lost. The house surgeon found him with a full, strong, and frequent pulse, and bled him. He afterwards administered an emetic, which was acting when I saw him at twelve o'clock, Sunday. The pulse was still full and strong; and there was great pain in the head. The pupils were about the middle state; the irides nearly, but not quite, motionless; and vision so completely extinct, that when a lighted candle was held near the eyes, the patient was not sensible of its presence. I ordered repetition of bleeding, and the application of a large blister at the nape. These means were again repeated. In a week vision was restored; and in a fortnight the patient left the hospital quite well."[2]

Case 3.—*Amaurosis from suppression of a purulent discharge.*—A wagoner, aged 45 years, undertook a journey in wet and cold weather. The discharge from ulcers of his legs, which

[1] Sir C. M. Clarke on the Diseases of Females, p. 316—320. edit. iii.
[2] Lawrence's Treatise, p. 494.

had for many years continued open, was suppressed, and he became blind. Fourteen days after he was brought to the hospital. He saw nothing, not even a brightly lighted window. The pupil was oblong, and extremely dilated. Beer immediately pronounced the most favourable prognosis, especially as there were present internal sensations of light in the eye, without varicosity, and without change in the humours. He had cured more than twenty such amaurotic patients, by restoring the purulent discharge. The material part of the treatment consisted of the following measures:—sinapisms of the size of the hand to the ulcers of both legs, pediluvia with mustard. The sinapisms were renewed daily, and on the tenth day vision began to return. The sinapisms acted severely on the ulcers, which became deep cavities, with dark coloured edges. In thirteen days vision was almost completely restored.[1]

Sect. IV.—*Amaurosis from the Operation of certain Poisons.*

A variety of substances have been supposed to be capable of producing amaurosis, as belladonna, hyoscyamus, tobacco, opium, stramonium, &c. When belladonna is taken in an over dose, it produces symptoms of intoxication, amaurosis, with dilated pupils, dryness of the mouth, great thirst, tremor of the tongue, vertigo, nausea, and sickness, difficulty of deglutition, and a feeling of great distress and anxiety about the precordia; the face becomes red and bloated, and these symptoms terminate in convulsions, coma, paralysis, and death.

Case 1.—"M. Koestler, of Vienna, has recorded, in an interesting memoir, the phenomena which presented themselves in five persons of different ages, who, ignorant of their deleterious properties, had eaten, more or less freely, of the berries of this deadly plant. It appears, from his account, that a man, with his son, aged nine years, walking one afternoon in the woods near Dornbach, and seeing the branches of belladonna bearing black and brilliant fruit, resembling wild cherries, gathered some for his son, who ate them freely, on account of their sweetish taste; the man also ate ten berries, and carried home a large quantity for his other children; a younger son, not quite five years old, ate a great number; two elder daughters ate less. All went to bed afterwards apparently well. Towards morning the two boys were restless, and soon became delirious. M. Koestler saw them about ten, A. M., and learned that a little while after eating the berries, the father drank some new and sourish white wine; during the evening he vomited, and had several alvine evacuations. In the morning, he suffered only from a slight headach, accompanied with a little stupor, and from time to time some griping in the bowels. The youngest of his daughters, who had eaten fewest of the berries, and who had vomit-

[1] Quarterly Journal of Foreign Medicine and Surgery, vol. i. p. 448.

ed during the night, complained of pain in the head, and dimness of sight; but the pupils were not much dilated. The other daughter, who was older, had eaten more, and she had not vomited as her sister had; she, therefore, presented much more alarming symptoms:—viz., violent headach, with stupor, vision indistinct, pupils very much dilated, walk unsteady and tottering, vertigo, stomach and bowels torpid, *pulse regular*, tongue clean, and occasionally slight eructations, tainted with the smell of belladonna. In the two boys, the effects of the poison appeared in full force, by restlessness, and attempts to escape, so that they were with difficulty confined to their beds, continual motions of the hands and fingers, and desire to lay hold of the coverlets, or other objects within their reach, or to thrust their fingers into their nostrils; delirium acute; but the wanderings only on lively subjects; actual vision almost gone; but at the same time both the boys fancied they beheld a crowd of objects; extreme dilation, and insensibility of the pupils; the eyeballs alternately fixed and rolling; spasmodic actions of the muscles of the face, grinding of the teeth, yawning, &c.; voice hoarse and weak; slight swelling of the left side of the throat, and burning sensation in the œsophagus (in the eldest of the two boys) *decided aversion to all liquids in both, and spasmodic attacks, whenever they were forced to swallow anything;* lastly, great excitement of the genitals, and involuntary passing of urine. On the whole, the symptoms presented (as will be seen) some analogy to *mania, without fever;* for the vascular system was neither locally nor generally excited, and the respiration was not sensibly disturbed.

"Emetics of ipecacuan and tartarised antimony were administered to the eldest daughter, and the two boys, the father, and youngest daughter, having previously vomited, took as antidotes the vegetable acids; as also did the other daughter, after the operation of the emetic; under which treatment they all three quickly recovered.

"The two boys, however, did not vomit until they had taken ℈iv. of ipecacuan, and gr. x. of emetic tartar: the eldest then brought up many seeds, and much pulp of the belladonna, mixed with bile and mucus; the youngest, who had eaten more, and whose stomach was more torpid, discharged less. As swallowing was extremely painful, they had clysters of vinegar and water administered every hour, and vinegar lotions were assiduously applied to the head, and along the spinal column. By these means the agitation diminished considerably; nevertheless, the youngest slept but little during the night, and both the boys were delirious the following day, although in a less degree. They passed many fetid evacuations from the bowels, in which the remains of belladonna berries were perceived. On the morrow they were well, with the exception of a slight dimness of sight, and a feeling of tightness in the neck of the eldest." [1]

[1] Stephenson's and Churchill's Medical Botany, edited by Gilbert T. Burnett, p. 6—8.

Hyoscyamus produces very similar symptoms, viz. amaurosis, with dilated and immoveable pupils, madness, intoxication, stupor, apoplexy, convulsions, and, finally, death.

Tobacco possesses two active principles, an essential oil, and a peculiar acrid principle, which is volatile, and soluble both in water and alcohol, named nicotin. Sir B. Brodie has discovered that the former acts on the nervous system, whilst the latter affects the heart.

Case 2.—"A young man, residing in Leicester Place, unaware of the serious consequences, infused about an ounce of tobacco in a quart of coffee, that was standing in the pot for the use of the maid-servant, a girl eighteen years of age, and of robust health. Of this a large teacupful was hastily drank, which immediately produced the most depressing nausea, inefficient attempts to vomit, vertigo, tremors, a copious flow of urine, and the greatest depression of the vital powers that could be imagined. Under these circumstances, Mr. Churchill was sent for, and found her bathed in cold perspirations; the pupil was dilated; and the pulse so feeble as scarcely to be felt: she had lost the power of speaking. Frictions to the region of the heart were vigorously employed, and vomiting excited by large draughts of the carbonate of ammonia, dissolved in water, and by the application of a feather to the fauces. These efforts were soon effectual in evacuating the stomach, but the general torpor of the system existed six hours, and she required constant attendance for that time, during which frictions were very generally employed: hot water was applied to the feet; and a stimulating purgative injection was most advantageously administered. When vomiting had been copiously excited, pills, composed of the compound extract of colocynth, combined with capsicum, evacuated the intestines; after which, the girl quickly recovered, merely requiring some effervescing medicine, containing small doses of opium."[1]

Dr. Marshall Hall, in the Edinburgh Medical and Surgical Journal, has given an interesting account of a young man, aged nineteen years, who had been unaccustomed to the effects of tobacco, except for a day or two before, and who smoked two pipes, without the usual caution of spitting out the saliva; and partook, at the same time, of a little porter. He was seized, in consequence, with nausea, vomiting, and syncope. He went home, and went to bed. Soon after he was seized with stertorous breathing and stupor, general spasms, and insensible pupil. Next day (proper treatment having been used), the tendency to fainting continued, and in the evening the stupor, stertor, and spasms, returned; but from that time he steadily recovered.

Treatment.—All pressure from the neck should be removed; the head and shoulders should be raised, the stomach effectually cleared by the sulphate of zinc, or copper, &c. or the stomach pump.

[1] Stephenson's and Churchill's Med. Bot.

Should there be an alarming degree of stupor, it would be proper to unload the vessels of the head by bleeding and cold applications. When the stomach is thoroughly evacuated, we should administer the vegetable acids, as vinegar with diluents, and saline purgatives. In amaurosis from tobacco, when there is much depression of the vital powers, stimuli, as wine, brandy, ammonia, &c. with brisk friction, and sometimes artificial respiration, are required, in addition to the already mentioned means.

Authors have enumerated many other substances, which sometimes induce amaurosis.

"Bosman narrates a case, where amaurosis came on from the saliva of a serpent getting on the face."

"A young healthy man, when lying awake early in the morning, perceived a large spider on the corner of his bed. When the animal was immediately over his head, his wife seized it, and it emitted a drop of liquid, which fell directly on his eye. He rubbed the eye, and immediately found that he could see nothing; at the same time there did not appear any external change."[1]

In the London Med. Obs. vol. iii. there is an account of amaurosis produced by the bite of a mad dog.

"Beer has known amaurosis produced from lead, both when used as a cosmetic, and taken internally."

"Beer mentions that he had seen a woman, who was attacked with violent vomiting as often as she drank chocolate, and for several hours afterwards remained quite blind. He considered the occurrence as the consequence of the exertion of vomiting; but having had occasion to see her affected with vomiting from a different cause, without the blindness being produced, he prohibited the chocolate, and she had no return of the blindness."[2]

CHAPTER VII.

Amaurosis from Affections of the Nervus Trigeminus.

Section I.—*Affections within the Cranium.*

Magendie has shown that injury or disease of the fifth nerve within the cranium is followed by amaurosis, destructive ulceration, and at length the complete evacuation of the contents of the eye-ball. He states, that, on division of the nerve within the cranium, anæsthesia of the same side of the face is produced, and of the eye especially, so that no impression is made on the conjunctiva,

[1] Boerhaave de Morbis Oculorum.
[2] Wardrop's Morb. Anat. of the Human Eye, p. 190—192, edit. 2, vol. ii.

even by the most irritating chemical agents. These were the immediate results of division of the nerve, and were succeeded by others not less remarkable: on the following day, inflammation of the conjunctiva had occurred of the sound eye, to which ammonia had been applied, whilst the other was entirely free from it. Other changes supervened, however; for in twenty-four hours after the cornea of the eye of that side on which the section had been made, began to get opaque; it was much more so after seventy-two; and five or six days after it had become as white as alabaster. The conjunctiva becomes red and inflamed, and secretes a puriform matter about the second day; the iris likewise becomes red and inflamed about the same time, and lymph is thrown out. At length the cornea ulcerates, the humours of the eye escape, and the tunics collapse into a small tubercle.

Magendie observes that these phenomena "depend upon an influence purely nervous," "an influence independent of the connection of the nerve with the spinal marrow," an influence "proper to the nerve, which has not its source in the cerebro-spinal system, and which is even the more energetic the further we remove from that system to a certain distance," of which the following is his proof. "Alterations of nutrition in the eye are the less complete, the less rapid, as we remove farther from the point of branching of the nerves of the fifth pair, and as we cut within the cranium, the fasciculus of origin the nearer to its insertion; finally, the section of the nerve on the margin of the fourth ventricle no longer produces any alteration in the state of the eye."[1]

Dr. Abercrombie observes that a remarkable circumstance connected with the affections of the fifth nerve, is the tendency to inflammation and sloughing in parts which have lost their sensibility, particularly the eye. A very instructive case of this kind occurred to my friend Dr. Alison. The patient had loss of common sensation on the left side of the face, the left nostril, and left side of the tongue, with insensibility of the ball of the eye, and occasional bloody discharge of the left nostril, and was liable to attacks of pain occasionally accompanied with fever, during which the pain was chiefly referred to the insensible parts. There were frequent attacks of inflammation of the left eye, with dimness of the cornea, which were relieved from time to time by the usual antiphlogistic means; but at the end of two months, a line formed round the base of the cornea, which at length sloughed out, and the contents of the eye were entirely discharged. The muscles of the left side of the jaw were paralytic, and felt quite flaccid when the patient chewed or clenched the jaws, but the motion of the muscles of the cheek was unimpaired. After the destruction of the eye, the paralytic symptoms remained stationary for a year or more; there was then a violent return of headach with fever, and death in a state of coma after an illness of a fortnight. On inspection, there was found consider-

[1] Journal de Physiologie, p. 304.

able ramollisment of some of the central parts of the brain. The fifth nerve of the left side, on being traced backwards from the ganglion, was found, close to the ganglion, to be of a very dense texture, but beyond this it was much wasted; at its junction with the tuber annulare, nothing but the membrane seemed to remain. In another case of Dr. Alison's, there was loss of sensation of the left side of the face, followed by inflammation and sloughing of the eyeball; after which the sensibility of the parts returned. The patient was, before the appearance of these symptoms, and has since continued, liable to severe headach and epileptic fits. The loss of sensibility continued about six months.

A remarkable combination of symptoms occurred in a case related by Mr. Stanley (Med. Gazette, vol. i.); there was hemiplegia of the left side, without loss of sensation in the arm and leg, but in the left side of the face both sensation and motion were entirely lost. In the left side of the tongue, sensation was lost, but motion remained. The mucous membrane of the left nostril was always of a deep red colour, and there were frequent discharges of blood from it. The conjunctiva of the left eye became deeply injected; this was followed by opacity and ulceration of the cornea, and at last by total disorganisation of the eye. There was total loss of hearing in the left ear. There were frequent attacks of erysipelas, which were entirely confined to the paralytic parts of the face. The patient had been long affected with headach, and at last died two months after the commencement of the paralytic symptoms. A tumour was found in the left side of the tuber annulare, which compressed the origin of the fifth and seventh nerves against the base of the skull. The tumour was the size of a walnut, of a firm consistence, and brown colour, and extended into the left crus cerebelli.[1]

Magendie, in order to determine the influence of the fifth nerve upon vision, performed the following experiments, from which he inferred that the section of the fifth nerve destroys sight without abolishing entirely all sensibility of the eye for light, and suggests in explanation either that the fifth is the medium of perception, or that it is necessary to enable the optic to act. After having divided the fifth pair on one side in rabbits, he threw suddenly upon the eye the light of a wax candle, and no effect was produced; the same being tried upon the sound eye, the only effect produced was movements of the iris. Under the impression that it was not sufficiently intense, he tried that of a powerful lamp, but, even with the assistance of a lens, the result was the same. He then tried the experiment with solar light, and by making the eye pass suddenly from the shade to the direct light of the sun, an impression was produced, and the animal immediately closed its eye-lids. Such data cannot be admitted as sufficient to justify the inference that vision is destroyed by section of the fifth nerve. In the first

[1] Loc. Cit. p. 531.

place it is to be recollected that the experiment was made upon rabbits, in which Magendie has elsewhere told us that section of the fifth nerve produces strong contraction of the iris, consequently great diminution of the size of the pupil: and of what value, then, is the result that under the influence of the light of a candle or a lamp, an impression was made sufficiently powerful to cause the animal to give evidence of it. In the second place, the animal did, under all the disadvantages, give sufficient evidence that its vision was not destroyed; there is, therefore, no reason for the conclusion drawn from the experiment related.[1]

M. Serres gives, in the fifth volume of the Journal of Physiology, the case of a young man, an epileptic, who was admitted into the Hospital La Pitié under that gentleman, in September, 1823. At his admission he had a chronic ophthalmia of his right eye, which was considered scrofulous. In the course of December, he was attacked by an acute ophthalmia of the same eye, attended by œdema of the lids, and commencing opacity of the cornea, which, aften ten or twelve days, became opaque throughout its whole extent, the inflammation, however, being subdued, but vision was completely lost. In the course of January, 1824, it was observed that the right eye was insensible, and soon after that the eye-lid and nostril of the same side were also insensible, and likewise the tongue on that side, while all was natural on the other; soon after the gums inflamed upon the right side; they were red, and were swollen at the circumference of the sockets, some white specks existing here and there; the tongue was always moved with difficulty; the hearing was not affected at that time. In July, the affection of the gums extended to the left side, but the right was always affected in a greater degree than the left. The gums became separated from the necks of the teeth on the right side during August; and there existed spaces in which tartar and portions of food had penetrated between the teeth and the gum spaces; the patient suffered from epileptic attacks with variable degrees of severity; he next fell into general cachexy, with extreme debility, impeded respiration, small but frequent pulse, great alteration of the countenance, and unusual taciturnity. It is stated that he acknowledged deafness on the right side in August, which diminished and again increased; the sensibility was perfect in all the extent of the right side of the face. The patient died on the twelfth of August. On examination after death, both the brain and the fifth nerve were found much diseased, the brain on the left side, but the nerve on the right.

[1] Dr. Alcock, in the Cyc. of Anat. and Physiol. vol. ii. p. 308.

SECTION II.—*Amaurosis from Affections of the Branches of the Fifth Nerve.*

It has been long known that wounds of the forehead occasionally produce blindness. Hippocrates observes that "the sight is obscured in wounds which are inflicted on the eyebrow or a little higher."[1]

Amaurosis may be the immediate effect of wounds of the frontal nerve, or it may supervene more gradually as the wound cicatrizes.

But frequently in wounds of the forehead other mischief is done besides injury of the frontal branch, such as concussion of the globe, fracture of the orbit, &c. Mr. Lawrence on this subject remarks that wounds of the eye-brow, and neighbouring frontal region, are sometimes attended with more serious consequences than mere alterations in form, and the consequent effect on personal appearance. A violent blow in this situation, with or without wound, may affect the globe, as well as the external soft parts; may cause serious injury by concussion, without external wound, and thus sight may be impaired or entirely destroyed.

The bone may be fractured, and the anterior cerebral lobe injured; or the fracture may extend along the thin, brittle, orbital process of the frontal bone, reaching to the optic nerve, or to the union of the two nerves. In such cases injury to sight, in various degrees, will probably accompany the external wound, but the state of vision is here a subordinate point; our attention is called to the danger to life, and the means we resort to for averting it will probably be equally advantageous to the eye. It is obviously necessary, in all such accidents, for the surgeon to examine the globe carefully, and to ascertain, as soon as circumstances will allow, whether vision is impaired or lost.

It is probable that amaurosis is only produced when the frontal nerve is wounded or injured, and not divided; for it is sometimes cured by making a complete division of its trunk nearest its origin. Mr. Wardrop, who has seen several cases of this form of blindness, states that it is an example of the sympathy which exists between parts whose nerves have a direct communication; the ophthalmic branch of the fifth pair sending off the frontal nerve, and also a twig to join the third pair to form the lenticular ganglion, which, according to the authority of Bock, has visible communication with the retina.

"It has appeared to me that (from the connection subsisting between the frontal nerve with the lenticular ganglion) whenever amaurosis has followed an injury above the eye-brow," says Mr. Middlemore, "the pupil has been more or less angular, quite immoveable, and drawn from its central position—at all events it has been much less circular than it ought to be. If the pupil has

[1] Letter xiii. art. 5.

retained its clear black appearance, whatever may have been its figure or the character of its outline, I have not remarked that vision has been altogether destroyed—it has been, under my own observation, more or less seriously impaired, but I have not remarked that it has been absolutely lost."[1]

Beer, who has written largely on amaurosis which results from wounds of the fifth pair, observes that it may be instantaneous, or that it may be developed soon after the injury; it may occur during the healing or cicatrization, or after the process is completed; or it may be the consequence of simple bruise without wound. The amaurosis may be formed quickly or tardily. He observes that where wounds of this nerve are speedily healed by the adhesive process, no bad consequences ensue; but when suppuration and granulation occur, owing to the wound healing by the second intention, the divided nerves are compressed and irritated by being involved in the inflammatory process, and included in the hard cicatrix. The pupil is sometimes contracted, sometimes dilated, in such cases. Beer warns us against confounding the amaurosis which is produced by wounds of the fifth pair, with the blindness which results from the concussion of the eye-ball, and not improbably, laceration of the retina, and to remember that a severe blow of the eye-ball may have occurred together with wounds of the eye-brow or eye-lids. His treatment consists in dividing the nerves involved in the cicatrix, and he tells us that vision may frequently be perfectly restored by this operation.

The connection which subsists in so remarkable a manner between the nervus trigeminus and the retina, explains the manner in which impressions on that nerve are beneficial in amaurosis.

Case 1.—*Amaurosis from injury of the frontal branch of the nervus trigeminus.*—Last summer, observes Mr. Lawrence, I saw a gentleman, about twenty years of age, ten weeks after he had received a violent blow on the left eye-brow. The skin was divided, but the patient was not stunned, nor did he experience the slightest headach, either at the time or afterwards. The lids were greatly swollen after the injury, probably from ecchymosis, so that he could not open the eye. When he did open it, at the end of a few days, he could see nothing, although the surgeon informed him that there was no perceptible change in the eye. He was bled, purged, and confined to low diet. I found the appearance of the eye quite natural. The pupil contracted and dilated in sympathy with the other, but its independent motion was completely lost. It became dilated when the opposite eye was closed, and remained motionless in that state. Vision was extinct, so that the difference between light and darkness could not be distinguished. There was a small cicatrix on the eye-brow, near the external angle of the eye. (Loc. cit. p. 130.)

Case 2.—Camerarius relates the case of a young man who had

[1] Loc. cit. p. 362, 363.

received a slight wound at the inner angle of the left eye, close to the upper eye-lid. The wound, though small, penetrated to the bone, and the patient immediately felt a severe pain, which was attended with swelling of the part, and by palsy of the right side of the body. The vision of the right eye became dim, and that of the left was totally lost, although nothing appeared diseased about the eye, except a slight dilation of the pupil. The left upper eye-lid was also paralysed. The use of hot mineral waters seemed to restore the motion of the eye-lid, and also of the right leg and arm. The sight of the right eye was in some degree restored, but that of the left was irremediably lost.

Case 3.—"A gentleman received an oblique cut in the forehead, which, from its direction and depth, must have injured the frontal nerve. The wound was not accompanied by any severe symptoms, and soon healed. But afterwards the vision of this eye began to fail, and in a few months was completely destroyed; the pupil was much dilated, the iris was not influenced by variations of light, and had slight tremulous motions."

Case 4.—"A sailor got a blow on the edge of the orbit from a ramrod, at the place where the frontal nerve passes on the brow. The vision of that eye was instantly destroyed, and when I saw him several years after the accident, the eye remained amaurotic, with a dilated and immoveable pupil. A cataract had formed in the other eye."

Case 5.—"An officer, at the siege of Badajos, received a deep wound on the eye-brow by the piece of a shell, which from its direction must have injured the frontal nerve. Great inflammation and pain succeeded the wound, the vision of the eye became gradually imperfect, and, after a few months, was entirely lost. The pupil was very much dilated and immoveable, and the crystalline lens opaque."[1]

Case 6.—Mr. Middlemore gives a case where division of the nerve was completely successful in restoring vision. "A person received a wound just above the right eye-brow, from a piece of glass, which was removed immediately after the accident by the patient himself; the wound was then dressed with simple dressing. It healed in a few days, but to the patient's great surprise, the sight of the right eye was very nearly lost; he had a painful sensation in the neighbourhood of the cicatrix, and a singular sense of creeping, itching, and quivering of the upper eye-lid, and the integuments of the forehead. The eye was perfectly natural in appearance, except that the action of the iris was sluggish, the pupil dilated and drawn slightly towards the nose. I made a free incision of the parts in the site of the cicatrix quite down to the bone, and all uneasiness at once ceased, the eye shortly afterwards assumed its healthy character and functions, and vision was permanently restored. If, however, the sight, which I have represented as re-

[1] Wardrop's Morb. Anat. of the Eye, p. 194, 195, vol. ii.

appearing soon after the performance of this trivial operation, had declined as the healing process advanced, it was my intention to have excised the cicatrix, not, I must confess, in consequence of any practical acquaintance with the advantages of that mode of treatment, but from the views and with the intentions I have already explained."[1]

Injuries of the other branches of the nervus trigeminus occasionally produce amaurosis. "Wounds," says Mr. Wardrop, "of the infra-orbitary nerve, and *portio dura*, are sometimes followed by amaurotic symptoms. Beer mentions an instance of the former, and I saw an officer in whom a ball wounded some branches of the latter nerve, which was followed by amaurosis." (p. 195.)

Case 7.—*Amaurosis caused by a carious tooth.*—" F. P., thirty years of age, possessing a good constitution, and enjoying good health, with the exception of pains in the head and limbs, which never lasted long, suddenly experienced, in the autumn of 1825, a violent pain, shooting from the left temple to the eye and the side of the face: he ascribed it to cold. This pain lasted several days, then lessened, and re-appeared from time to time without being sufficiently severe to induce the patient to seek medical aid. In about two months it suddenly increased in intensity, occupying the eye particularly, with a feeling as if it would pass out of the orbit. F. P. now discovered that he was blind with that eye, and applied to a neighbouring physician, whose treatment, continued for two months, did no good. The pain, however, was no longer continual: it assumed a somewhat periodical character, leaving the patient easy for some hours of the day. At the end of the following six months the pain increased, the cheek swelled, some spoonfuls of bloody matter were discharged by a spontaneous opening in the lower eye-lid, after which the swelling subsided, and the pains nearly disappeared; although the blindness remained complete. The discharge was renewed from time to time, during the following six months, and there was no great suffering. But in the autumn and winter (1826) the pain, particularly in the eye, became so violent, that F. P. came to Wilna in the beginning of 1827, determined to have the organ extirpated, if no other remedy could be found. Professor Galenzowski found the left eye totally insensible to light, with the pupil dilated, and no other visible alteration. The pain, not then so severe, consisted in violent occasional pricking or darting sensations in the left temple, and parts round the eye. There was discharge from the lower eye-lid. The first molar tooth of the left side was carious; it had not caused much uneasiness; and the tooth-ach, when it existed, had not coincided with the pains in the temple and eye. The professor determined on removing this tooth, and having done so, was surprised to see a small foreign body at the extremity of the fang. When drawn out,

[1] Namely, to free the nerve from its implication in the cicatrix. (Middlemore's Treatise, vol. ii. p. 364.)

it proved to be a small splinter of wood, about three lines in length, which had traversed the centre of the tooth, and had probably been introduced in picking the teeth. A probe passed from the socket into the antrum, from which a few drops of thin purulent fluid escaped. The pain ceased almost entirely, and on the same evening, the eye began to be sensible to light. Vision gradually improved, so that, on the ninth day, the patient could see as well with the left eye as with the right, after a blindness of thirteen months: on the eleventh day he left Wilna to return to his family."

"I had," says Mr. Lawrence, "the pleasure of becoming acquainted with Professor Galenzowsky, when he visited England subsequently to this occurrence. He showed me the tooth and the splinter of wood. He pointed out two circumstances in the case as particularly worthy of notice:—1st, that the entrance of the foreign body into the tooth had not been noticed at the time; and secondly, that a local irritation, hardly perceived in the seat of injury, should have affected the ramifications of the nervus trigeminus so violently as to produce amaurosis."[1]

CHAPTER VIII.

Congenital Amaurosis.

In congenital amaurosis the blindness is either complete or incomplete—the patient possessing an imperfect degree of vision.

Mr. Travers notices four forms of congenital amaurosis; in the first, the eye is preternaturally small, soft, and even flaccid; the iris is tremulous, and not at all influenced by belladonna; the globe affected with tremour, and not under the influence of the will; in the second, there is a deficiency of pigmentum nigrum, the eye is tremulous; vision is dazzled and confused by strong light, which produces great uneasiness, and the vessels of the choroid give the interior of the eye a deep pink tint; in the third, the cornea is so encroached on by the sclerotica, that it is scarcely larger than the pupil; in the fourth variety the eyes move in concert as if attracted by a faint perception of light, although the infant is quite blind; there are no visible marks of organic derangement; although he supposes the blindness connected with a morbid condition of the optic nerve or thalami.[1]

During the first weeks or months of the infant's existence it would be extremely difficult, if not impossible, to decide whether amaurosis did or did not exist, should it be unconnected with evi-

[1] Lawrence's Treatise, &c., p. 562—4. Archives générales de Medecine.
[2] Synopsis, p. 153, 154.

dent malformation. All doubt on this subject would, however, be cleared up as soon as that period arrives at which the child usually begins to survey with attention surrounding objects, and when the countenance is expressive of dawning intelligence and animation, instead of which in the amaurotic the aspect is vacant and unmeaning—the amaurotic aspect.

Congenital amaurosis is frequently complicated with cataract, with or without evident malformation of the eye. In this form of blindness the eye acquires a peculiar oscillatory motion, where the least perception of light remains, which is involuntary, and remains generally through life.

Cases.—"A fine and healthy infant, which I saw at the age of six months, was quite blind. The eyes on cursory inspection, would have been pronounced free from defect. They were blue like those of the mother and father. The pupil, which was of the middle size and clear, was not observed to vary in its dimensions. The iris was in contact with the cornea. The mother had brought forth seven children, three of whom had been born blind in this way. I have seen other instances of congenital amaurosis, where the eyes appeared perfect. In a family of children belonging to a healthy father and mother, one of whom had blue, the other dark eyes, some were light, and the others dark-eyed. The latter had all of them become successively amaurotic in their early years, without apparent cause."

"Five or six years ago," said Mr. Gibson, "I recollect to have seen five or six children, the families of two sisters, who were all totally blind, and in an idiotic state, with cataracts, accompanied with amaurosis."[1]

All cases of congenital amaurosis, however, depend, without doubt, as regards their pathology, on some defect, or arrest of development, of the visual nervous structures; and consequently do not admit of relief or cure, by any science or art. But in amaurosis in children, it is necessary to bear in mind that cerebral mischief, as from convulsions, the irritation of teething, &c., is a frequent cause of such symptoms, and which frequently admit of relief.

[1] Lawrence's Treatise, p. 516.

CHAPTER IX.

Amaurotic and Nervous Affections.

SECT. I.—*Glaucoma.*

Glaucoma (γλαυκός, bluish green.) Under the term of glaucoma, is comprehended an affection characterised by a deep-seated green appearance of the humours, gradual failure of the function of the retina, and frequently, after the disease has continued some time, a greenish-coloured cataract.

Under the name of glaucoma, all opacities behind the pupil were included by Hippocrates, so that, in his classification, it included a great number of opposite and dissimilar affections.

It is of the greatest importance to discriminate this affection from cataract in its early stages, and to detect its co-existence with an amaurotic condition of the retina during the later stages of the disease, should the lens become opaque; since no operation for the removal of the cataract is likely to be of service.

Symptoms.—There is usually severe frontal headach, and, towards night, great pain over the brow. The degree of pain experienced varies considerably in different cases, in proportion to the activity and violence of the local inflammation; and, in some cases, frequently in senile glaucoma, little or no pain is complained of. The sight fails rapidly in acute glaucoma; but in the more usual forms of this disease, it is rarely abolished for a considerable time from the commencement of these symptoms. If we examine the eye, we find that, instead of exhibiting its natural black colour, the pupil is sea-green, muddy green, or yellowish green. There is a discoloration, which, if we look at it in a strong light, appears like a yellowish metallic reflection, and sometimes concave; it looks almost as if there was a portion of metal at the bottom of the eye. The state of vision is different, in different instances; in some, the alteration of the pupil is distinctly produced; and yet vision remains tolerably perfect. In other cases, vision is entirely lost; though the change of colour in the pupil is not greater than in the former instance. Sometimes vision is impaired in one eye, and not in the other, though the pupil may be equally discoloured in both.[1]

Large distended varicose vessels ramify on the conjunctiva and sclerotica; the iris dilates and becomes immoveable, as the retina becomes insensible to impressions of light; the pupil is not unfrequently irregularly dilated and pushed forwards to the cornea, so as, in some instances, to be in contact with that tunic. The eye, when examined, feels morbidly hard and resisting, owing to the increased quantity of the vitreous humour.

[1] Lawrence's Treat. p. 389—90.

In acute glaucoma, the symptoms are very severe and rapid in their progress, and occur suddenly. The junction, says Dr. Mackenzie, of the sclerotica and cornea, is of a pearl-white colour; racking pain is complained of in the eye and head, and vision becomes totally extinct. Such symptoms sometimes occur suddenly, constituting what is termed acute glaucoma. After some time, the inflammatory symptoms generally subside, and the contents of the eye-ball begin to be absorbed, so that it shrinks to less than its natural size; and, instead of the preternatural hardness, which it formerly presented, becomes boggy. In some cases the cornea, pressed upon by the hypertrophied lens, ulcerates and gives way, so that the lens is discharged along with a considerable quantity of blood.[1]

The appearance of muscæ volitantes, and luminous ocular spectra, as sparks, flashes of fire, &c., are complained of; and not unfrequently the lateral parts of the retina retain some degree of sensibility after the centre is completely insensible,—thus producing visus obliquus, the eye being sensible to objects placed laterally as regards the patient, whilst it distinguishes none in any other direction.

Causes.—Glaucoma occurs much more frequently in individuals who are past the middle period of life, and in arthritic subjects. Indeed, "so common is glaucoma in those far advanced in life, that we may almost regard it as part of the changes coincident with old age."[2] Beer observes that "glaucoma and green cataract, considered as consequences of inflammation, belong to arthritic inflammation of the globe; and the same forms of disease, when occurring without inflammation, are only seen in the gouty."

Full habits, and persons accustomed to free living, but especially to strong and generous liquors in excess, are predisposed, and more commonly affected, than spare and less plethoric habits, or those who live in a hardier and less luxurious manner.

Dr. Mackenzie suspects that the habitual use of spirits and *tobacco* operates powerfully in the production of glaucoma; and that the disease appears to be more apt to occur in those who have been scrofulous in childhood, or who have exerted their eyes much on minute objects, or such as reflect white light. Glaucoma occurs more frequently in some places, and among some societies, than others. Thus Benedict asserts, that one half of the glaucomatous patients, whom he saw during twelve years' practice in Breslaw, were Jews, among whom he states that the affection is very common.

Proximate causes.—Inflammation of the hyaloid membrane and internal tunics, which differs exceedingly in its activity and severity in different cases, in some cases being so slow and inactive in its progress as scarcely to deserve the name of inflammation; in others inflammation, active in its character, and rapid in its pro-

[1] Mackenzie Pract. Treat. p. 825—6; edit. 2d. [2] Ibid. p. 829.

gress, appears to be the true proximate pathological cause of glaucoma. In senile glaucoma, the changes which occur depend, probably, on a similar condition of vessels as induces the chronic enlargement of the prostrate gland, or the opaque circle around the cornea (arcus senilis.) Mr. Lawrence observes, "it appears to me to be a chronic form of the same affection which I have described as arthritic inflammation affecting the internal tunics; the changes which occur in the retina, vitreous humour, and lens, as the consequences of that inflammation, are rapid and sudden; whilst, in the present case, the disease has a slower progress." Dr. Mackenzie supposes that the increased quantity of vitreous humour, which is the consequence of the inflammation, becoming superabundant, may promote, by its pressure, the absorption of the pigmentum nigrum, and at last render the retina insensible.

Prognosis.—The prognosis in glaucoma is undoubtedly unfavourable, since treatment, even during the early stages, is frequently inefficacious. Beer observes that sooner or later the other eye is likewise affected with arthritic iritis or ophthalmy, or becomes glaucomatous, a change which is ushered in by violent and incessant headach. He says that no treatment will be of any service in checking the progress of glaucoma, or in preventing complete amaurosis.

In confirmed glaucoma the case is absolutely hopeless and incurable by any treatment, but much may be done early in the disease in preventing its progress, if not in producing a cure, by the judicious employment of antiphlogistic remedies. "We cannot," says Mr. Lawrence, "bring back again the natural appearance of the pupil; we cannot restore the vision which has been lost; and all we can expect to do, is to preserve the little sight which remains."

Diagnosis.—Glaucoma may be confounded with cataract, but its diagnosis is not difficult, the green colour of a glaucomatous eye is alone sufficient to prove the case, at least not simple cataract, which is never green. A green cataract is invariably attended by glaucoma.

There is a diseased look about a glaucomatous eye; the cornea has lost its natural transparency and brilliancy, although not opaque; the sclerotica is of a bluish or yellowish colour, loaded with tortuous varicose vessels, which do not run on to the cornea, but dip into the sclerotica about the eighth of an inch from it, giving rise, when they are numerous, to the appearance of a whitish ring round the cornea. When the eye is examined by the touch it is found to be harder and firmer than natural. The iris has lost its natural colour and brilliancy: if blue formerly, it has become gray; if black, now a dirty brown; the pupil is dilated, and its edge irregular, sometimes displaced, which renders the pupil oval, unless it is contracted from iritis, which is not an essential characteristic of the disease. "In some rare cases, the opacity of the lens is so entirely free from any glaucomatous tint, and even possesses so perfect a character of a striated opaque lens, that if the appearance

of it alone were to guide the judgment of the surgeon, the disease would be pronounced to be "cataract." The internal symptoms accompanying such cases are, however, so marked as to prevent error, even if the external ones have been mistaken. The patient cannot distinguish between light and darkness. This capability was lost under symptoms of amaurosis, of flashes of light of various colours in the eye; and, above all, the progress of the disease has been, and in all probability continues to be, marked by pain, of a severe and often excruciating nature, not only as affecting the eye, but the forehead and the side of the head."[1]

When the pupil is dilated by belladonna, the green appearance of the humours in simple glaucoma seems to retire to a greater depth behind the iris, and becomes more circumscribed.

Glaucoma differs exceedingly from cataract as regards the degree of light in which vision is most perfect; the glaucomatous patient sees best in a strong light; whilst in cataract it is the reverse, the patient seeing tolerably well in a weak light, or when the pupil is dilated by belladonna.

"Attention to the following circumstances," observes Dr. Mackenzie, "will in general enable the careful observer to discriminate between glaucomatous amaurosis and cataract.

"α. The opacity in glaucoma is always greenish, whereas in incipient cataract, it is of a milk-and-water colour.

"β. The opacity in glaucoma is best seen when we look directly into the pupil, and disappears in a great measure, or altogether, when we look sideways into the eye. In cataract, the opacity is seen whether we look sideways or directly.

"γ. In glaucoma, the opacity appears to be seated at a considerable distance behind the pupil, or even deep in the vitreous humour, and always seems surrounded by a transparent ring; whereas, in lenticular cataract, it is evident that the opacity is close behind the pupil, and seems bounded by the edge of that aperture. In posterior capsular cataract, the opacity is deep in the eye, but it is always streaked; whereas the glaucomatous reflection is always uniform, never spotted, nor radiated.

"δ. When we examine narrowly the surface of a lenticular opacity, especially while concentrating the light upon it by means of a double-convex lens, it generally appears strikingly rough, and somewhat dull, in these respects forming a striking contrast to glaucomatous opacity. Speaking of glaucoma, Maitre Jan justly remarks that 'les cataractes luisantes sont toujours très suspectes.'

"ε. The eye-ball, in glaucomatous amaurosis, always feels firmer than natural; while in cataract, it presents its usual degree of resistance to the pressure of the finger.

"ζ. Glaucoma proceeds very slowly in its course; years pass over without much more appearance of opacity than was at first observed,

[1] Guthrie's Operative Surgery of the Eye, p. 223—5, edit. 3.

and with little or no further loss of sight; while in cataract, vision rapidly declines, keeping pace with the growing opacity."[1].

Pathological anatomy.—Repeated dissections of glaucomatous eye have convinced Dr. Mackenzie that yellowness of the centre of the lens, without opacity, added to a deficiency of the pigmentum nigrum, is the true cause of the glaucoma. "I am speaking," he says, "of incipient glaucoma, for in the advanced stage the centre of the posterior lamellæ of the lens is of a reddish-brown colour.

"The following are the particulars which I observed in the greater number of cases.

"1. The lens of a yellow, amber, or reddish-brown colour, especially towards its centre; its consistence firm; and its transparency perfect, or nearly so. In some cases, however, the reddish-brown colour of the central part of the posterior lamellæ was so deep as considerably to impair its transparency.

"2. The vitreous humour in a fluid state; perfectly pellucid, colourless, or slightly yellow. No trace of hyaloid membrane.

"3. The choroid coat, and especially the portion of it in contact with the retina, of a light brown colour, with little or no appearance of pigmentum nigrum.

"4. In the retina, no trace of limbus luteus, or foramen centrale." (p. 827.)

Professor Rosas remarks that the pathological changes exhibited by glaucomatous eyes are various. The vitreous tunic is commonly thickened, covered with lymph, ossified; the vitreous humour degenerated; the retina thickened, and marked with red spots; the choroid varicose, and the lens converted into a yellowish red cheesy mass. In another instance, the vitreous humour formed a true fungous growth, from which, when cut into, blood flowed; the retina was leathery and white, the choroid thin and atrophic, and the lens converted into a purulent fluid. In a fourth case, I found the vitreous humour, together with the lens which had become confounded with it, ossified, the retina cartilaginous, and the choroid atrophic. All these preparations are preserved in the pathological collection of the ophthalmic department in the University of Vienna.[2]

Professor Walther examined the eyes of a man who lost his sight a year before death, with violent pain of the head. Besides the discoloration of the pupil, which was not considerable in proportion to the loss of sight, the aperture was rather dilated, the iris convex anteriorly, the sclerotica bluish over the corpus ciliare, and vision completely extinct, although light was offensive. Several varicose vessels were observed in the conjunctiva and sclerotica. The lens and vitreous humour were in the normal state, and perfectly transparent; no change in the choroid. In the retina of both eyes were

[1] Mackenzie's Pract. Treat., p. 674, 675, 2d edit.
[2] Handbuch, vol. ii. § 1203.

numerous black and partly reddish spots, roundish and of various size; they were more numerous on the dentated margin, and not disturbed in their situation by gentle pressure.

Two glaucomatous eyes were dissected by Eble. One was from a woman of sixty, who had suffered much from gout, and had glaucoma completely developed in one eye for a year before death. The covering of the uvea was reddish brown, instead of the usual dark pigment. The vessels of the choroid were varicose in several places, particularly in the ciliary processes; the pigment was much lighter than natural, and had disappeared in many parts. The retina was of extraordinary softness; it was almost fluid, of an amber colour. The whole vitreous humour had a yellowish tint; and there were scattered through it twenty or thirty points of a gray, brownish green, or a sea-green colour.

The other patient was seventy years old, had frequently experienced arthritic inflammation of the eyes, and had become glaucomatous shortly before death. The vitreous humour was partially thickened, and firmer to the touch. The retina was more seriously affected than in the former instance, the vessels exhibited some varicose enlargement, and the colour being dark gray.[1]

It is abundantly proved that the seat of the greenish hue of glaucoma is not in the vitreous humour alone, but is the consequence of the pathological changes induced in the membrane of the pigment, retina, hyaloid membrane, and perhaps the vitreous humour and lens.

There are different species of glaucoma, and consequently the exact pathological changes may be supposed to vary, in proportion not only to the violence and rapidity of the inflammation, but also as regards its complications and causes. "There are," observes Mr. Middlemore, "two forms or varieties of glaucoma; that occurring in old age (*glaucoma senilis*), which is rather slight and productive of mere impairment of vision, and is neither associated with any material degree of pain, nor, as I believe, with any inflammation; but in which the transparency of the vitreous humour is always diminished, and its colour altered either to a yellowish or greenish tinge; and secondly, that variety of glaucoma taking place from inflammation of the septa of the vitreous humour (*glaucoma inflammatoria*), which is distinguished by symptoms of a more or less severe character, is often attended with chronic inflammation of other deep-seated textures (such as the choroid and retina), and usually leads to the total destruction of vision. Hence, then, the appearance of the membranes and humours of the eye will not always be the same, they will vary in accordance with the particular variety of glaucoma from which the patient may have suffered, so that without asserting that the retina is never affected in glaucoma either by pressure or from an affection of, or change

[1] Lawrence's Treatise, p. 391, 392.

in, its texture, we may safely assert that it is not necessarily, nor, I believe, frequently affected."[1]

Treatment.—From the pathology of glaucoma it will be evident that antiphlogistic remedies are required in the treatment, namely, blood-letting, purging, mercury, counter-irritation, rest, and regulated diet.

Blood-letting.—In acute glaucoma the treatment directed in ophthalmitis is applicable, but in the more chronic cases general bleeding is rarely necessary, though blood may be removed from the vicinity of the disease by leeches or cupping; but the extent to which the bleeding should be carried, and the frequency of its repetition, will necessarily be pointed out by the constitutional vigour of the patient and the urgency of the symptoms.

Mercury.—Calomel and opium, two grains of the former and half of the latter, or five grains of the mass of the pil. hydrargyrum with half the quantity of the extract of conium, may be taken every night until a gentle soreness of the gums is produced, which it will be our object to maintain by suitable doses of the mineral; such a condition of the gums, indicating an unirritating constitutional action of the remedy, may, in healthy individuals, be sustained for months, if necessary, with but little derangement of the general health.

Purgatives.—Active purgatives are in some cases required, where the symptoms are active, or the person plethoric; but, in general, it is only necessary to produce a laxative action of the medicine daily, thus the compound extract of colocynth, in five-grain doses at night, with the twelfth of a grain of the potassio-tartrate of antimony, or the compound colocynth pill, in similar (five-grain) doses is a good form, calculated to produce such an action. "When you are unable," observes Mr. Middlemore, "to administer mercury with the view of slowly and slightly affecting the gums, you may prescribe active aperients, which should be continued throughout the duration of the disease, so long as any symptom, requiring and likely to be benefited by treatment, remain.[2]

Counter-irritation.—Counter-irritation forms a very important part of the treatment of glaucoma, as in fact of most of the amaurotic affections; it should be used effectually, and its influence duly supported, whilst any symptoms likely to benefit by it are present. Blisters and the eruption produced by the tartar emetic ointment are more adapted to acute cases; setons, issues, &c., to chronic.

It has been proposed to puncture the sclerotic and choroid coats, in order to evacuate the superabundant contents of the vitreous humour, when there is much local pain and sensation of tension, and when the eye is manifestly distended, and vision nearly destroyed, the sound eye becoming sympathetically affected, should only one eye be diseased.

In order to evacuate the vitreous humour, a broad iris knife, or a

[1] Middlemore's Treatise, p. 7, 8. [2] Loc. cit. p. 18.

fine-grooved needle should be entered three or four lines behind the margin of the cornea, and directed obliquely backwards, being retained there for a sufficient length of time to allow the fluid to escape. Mr. Middlemore observes that "in two or three cases of glaucoma where the muddiness of the vitreous humour has been evidently consequent on the inflammation of the parts which secrete it, I have, on the subsidence of the inflammation of the hyaloid membrane, discharged the greater part of the turbid fluid by means of a fine-grooved needle, in the hope that the new secretion would be more transparent, and I am confident that I have more than once practised this operation with the greatest advantage to my patient's vision."[1]

Belladonna in some cases increases the patient's vision, and may be used daily by smearing the diluted extract around the eye, or by dropping an aqueous solution on the conjunctiva. Occasionally, however, the belladonna dazzles the patient, and increases the defect of vision already existing. As the retina becomes more and more insensible, so the benefit derived from the belladonna diminishes, until at length, when the retina has become quite insensible, it becomes perfectly useless.

Dr. Mackenzie states that the greenish colour is diminished, and the sight of the patient improved, by the removal of the lens from a glaucomatous eye. "At the same time," he observes, "although I am persuaded that the absence of the lens might be advantageous even in the early stage, and prevent, in a considerable measure, the further progress of glaucoma, extraction is an operation which I would by no means venture to recommend for general adoption. The patient generally sees too much to warrant our exposing him to the danger of arthritic inflammation coming on after the operation.

"That the early removal of the lens might prove a means of preventing glaucoma, and not merely the lenticular, but the retinal part of the disease, is a conclusion to which I was naturally led by the following case.

"Case 1.—R. C., aged 48 years, applied to me in March, 1820, in consequence of impaired vision of the left eye, which already presented a glaucomatous appearance. In his right eye there was a capsular cataract, the result of an injury forty years before, which had been followed by absorption of the crystalline lens. The vision of the left eye rapidly declining, while evident perception of light and shadow was still retained by the right, I opened the cornea of this eye, and drew the capsule out of the pupil, and partially between the lips of the incision of the cornea, leaving it to adhere there, and thus securing a passage for the rays of light into the interior of the eye. As good vision was restored by this means as generally follows an operation for cataract, and the patient was able, with the assistance of the right eye and a cataract-glass, to

[1] Vol. ii. p. 20.

follow his usual employment for some years. The vision of the left eye became still more impaired, under signs which appeared indubitably those of glaucoma and amaurosis. The patient, however, was persuaded that he had a cataract in this eye, and urged me to operate on it. This I declined; but I recommended the patient, since he had still doubts about the matter, to consult the late Dr. Monteath. He did so, and felt greatly disappointed when Dr. M. only confirmed the opinion I had given him. Not yet satisfied, he went to Edinburgh, where he unfortunately met with encouragement in the notion of his being affected with cataract, and accordingly underwent an operation, which was followed only by a violent and destructive inflammation.

"Now it has struck me, in reflecting on this case, that the total absence of glaucoma in the right eye might have been owing to the lens having been absorbed at an early period of life; for glaucoma is a disease which, under ordinary circumstances, very rarely, if ever, attacks the one eye, without speedily affecting the other also. The absence of the lens may have operated in preventing the affection of the hyaloid membrane, which ends in its destruction, and to which I feel inclined, so far as our present evidence goes, to attribute, in a great measure, that series of changes which gives rise to the symptoms of glaucoma."[1]

In senile glaucoma little or no treatment is required, or indeed of any service, unless there be evident inflammation of the hyaloid membrane, or of some neighbouring texture, when it would be necessary "to prescribe mild purgatives; perhaps, also, a little mercury, institute some plan of permanent counter irritation, and proscribe all employment of the eyes by artificial light, and in avocations requiring minute vision."

Sect. II.—*Hemeralopia.—Night Blindness.*

The greatest confusion exists among authors in the signification of the words hemeralopia and nyctalopia. By Hippocrates, hemeralopia is used in the sense now proposed, namely, night-blindness, as, indeed, it is by most of the best authors of the present day.

Definition.—Hemeralopia from ἡμερα and ωψ, consists of imperfection or loss of vision, which comes on about sunset, continues all night, and disappears towards morning.

Hemeralopia is not a common affection in Great Britain, but it is by no means a rare affection in the more southern latitudes, and on the continent of Europe, where the eyes are exposed to a more direct and vivid light. In some places, hemeralopia is endemic; while in others, at certain seasons of the year, it appears as an epidemic affection. Hemeralopia has received a variety of synonymous terms, as dysopia tenebrarum, amblyopia crepuscularis, visus diurnus, cæcitas nocturna.

[1] Pract. Treatise, p. 831, 832.

The blindness, during the attack in hemeralopia, becomes gradually more and more complete, until the patient can seen nothing during the night. The eye presents no unusual appearance, except dilation of the pupils, usually unaccompanied by headach or vertigo. The pupils move sluggishly, or in some cases are fixed and immoveable. Both eyes are always attacked simultaneously.

Mr. Broomfield observes, that "in general the nocturnal blindness is at first partial; the patient is enabled to see objects a short time after sunset, and perhaps will be able to see a little by clear moonlight. At this period of the complaint, he is capable of seeing distinctly by bright candle light. The nocturnal sight, however, becomes daily more impaired and imperfect, and, after a few days, the patient is unable to discriminate the largest objects after sunset, or by moonlight, &c.; and, finally, after a lapse of time, he cannot perceive any object distinctly by the brightest candle light. If the patient is permitted to remain in this state of disease, the sight will become weak by day light; the rays of the sun will be too powerful to be endured, whether they are direct or reflected; lippitude is sometimes induced; myopism, or shortness of sight, succeeds; and, in the progress of time, vision becomes so impaired and imperfect, that apprehensions of a total loss of sight are entertained; and this dreadful consequence has been known to ensue, where the complaint has been totally neglected, or left to nature, or where ineffectual remedies have been employed."

Complete hemeralopia may, however, occur suddenly, with or without some other intermittent paralytic affections; as in a case by Dr. Pye, in which the servant of a corn-miller was suddenly deprived of sight, and the use of his limbs, one evening near sunset. He was perfectly free from pain in his head and limbs, and had even a sensation of ease and pleasure. He remained perfectly blind the whole night, and without sleep, but as the day-light appeared, he gradually recovered his sight, and, as the light of the sun increased, he regained it completely. When he rose from his bed, his limbs were restored to their usual power, and he himself was in perfect health.

The same affection continued to recur, as regards his sight, without the paralytic attack in his limbs, during the night, and his sight returning in the morning. Dr. Pye found the pupils dilated during the paroxysm; but during the day they were perfectly natural. After nearly two months' continuance of this disease, it became less regular in its occurrence, ceasing for a night, or several nights together, and then recurring. He was directed cinchona; under which treatment he retained his sight from the first day after using it, but suffered from a spontaneous diarrhœa, from which he became weaker and weaker; he became delirious ten days after, and deprived of hearing, and died in five days more.[1]

The usual duration of hemeralopia, when left to itself, has been

[1] Medical Observations and Inquiries, vol. i. p. 111.

observed to be from about three weeks to eight months, or, rarely, more. The colour of the iris has nothing to do with the predisposition to this disease, nor has the size of the eyes, as stated by Hippocrates. It is stated by Boyer, that hemeralopic patients see perfectly in obscure days, whilst the sun is above the horizon, but very imperfectly when the sun sets, however bright its reflected light may be; and thus many of them can tell the precise moment of the sun's setting, in a cloudy moment, though that period cannot be distinguished by other people.[1]

Europeans, who have once been attacked by hemeralopia, are particularly liable to a recurrence of it, as long as they remain in a tropical climate. "Those who have had one attack of this complaint, are very apt to have a relapse every year, and always at the same season. Boyer relates the case of a man, forty-three years of age, who had been attacked with it every spring, from the age of twenty-three."[2]

People of all ages, and eyes of all colours and forms, are equally subject to this disease.

Causes.—The most frequent cause, according to Mr. Lawrence, consists in the exhaustion of the powers of the retina, by exposure to strong light during the day; hence night-blindness is only found in those places and climates where there is very powerful light, and is seldom seen, except between the tropics. In these regions, the full glare of a vertical sun in an unclouded sky, and the powerful reflection of the solar rays from the sea, or from a sandy soil, produce an excitement of the retina, to which we are wholly unaccustomed in our latitudes, although in some parts of Europe analogous influences exist in a sufficient degree to cause the affection. After the retina has been so strongly excited in the day, the feeble light of night and twilight does not impress it sufficiently for perfect vision. Europeans often suffer from this cause in the West Indies; more particularly those much exposed, as soldiers and sailors. The cases are especially numerous among the latter, and great numbers of a ship's crew often suffer.[3]

Hemeralopia is occasionally produced from derangements of the primæ viæ. It is most prevalent during the fruit season, and has frequently (I think with much propriety) been ascribed to imprudent indulgence in this tempting article of food, which produces gastric or intestinal derangement.[4]

The paroxysms of hemeralopia usually occur every evening at sunset; but it sometimes assumes a tertian or a quartan type, like the ordinary paroxysms of intermittent fever.

Hemeralopia frequently comes on as a precursor of scurvy, and is produced by the same causes. Mr. Bampfield observes that it

[1] Boyer's Malad. Chirurg. tome v.
[2] Wardrop's Morb. Anat. vol. ii. p. 208.
[1] Loc. cit. p. 569.
[2] Cyc. of Pract. Surgery, vol. i. p. 99.

should be referred to the same causes, when the subject of it has for a long period subsisted on salted diet at sea, &c., and if any other scorbutic symptom be present, such as spongy gums, ecchymoses, saline smell of the secretions, ulcers, with liver-like fungus, &c.[1]

In a few instances it is congenital and constitutional, and quite beyond the reach of any curative measures. Sometimes it is hereditary; and the writer of the article Nyctalopia in Dr. Rees's Cyclopædia, was acquainted with an instance in which it occurred to two children of the same family. A congenital case, which had continued many years without change, and independently of any disease, is related by Dr. Parham.[2]

Suppressed perspiration from damp, cold, night-air, has been known to induce the disease. It depends occasionally on plethora. It is a common opinion, likewise, among the vulgar in the East Indies, that eating hot rice brings on the affection.

Proximate causes.—The proximate causes of night-blindness differ probably in different cases; where it has been induced from the excessive stimulus of the retina during the day, it may depend merely on an inability of the retina to be excited by the slighter stimulus of the evening light, the difference between the splendour of the sun's light, and that of the moon or candles, being immense.[3] In like manner, it is observed that some animals, as owls, cats, &c., see only in a very moderate light; whilst there are other tribes, as fowls, which become very blind at twilight.[4]

When the hemeralopia is caused by plethora, or by derangement of the primæ viæ, there may be, probably, as its proximate cause, hyperæmia of the retina, or of the visual nervous textures generally, &c.

"On dissecting the eye of a deaf and dumb person, congenitally affected with night-blindness, numerous black spots were found in the substance of the retina, corresponding much to the description given by Walther, of the appearances found by him in the eyes of a man who had lost his sight a year before. In some cases, there is reason to suspect that the proximate cause does not affect the eye, but the brain."[5]

Prognosis.—Under proper treatment, a favourable prognosis may, in all cases of idiopathic hemeralopia, be given. In most cases the organs will recover their usual power, and recover perfectly too, even without treatment, in a space of time varying from one night to six months. Mr. Broomfield, in the fifth volume of the Medico-Chirurg. Transactions, states that he saw nearly three hundred cases of night-blindness, in a very short period, in the East Indies, and other parts, but chiefly in the Indies: of these,

[1] Medico-Chirurgical Trans. vol. v. p. 45.

[2] Cooper's Surg. Dict.; 7th edit. p. 683.

[3] "The strength of moonlight is computed to be $\frac{1}{300000}$th part of that of daylight.

[4] Wardrop's Morb. Anat. vol. ii. p. 209.

[5] Mackenzie's Pract. Treat. p. 883.

one hundred were affected with the idiopathic, and two hundred with the symptomatic, or scorbutic; the whole perfectly recovered.

Treatment.—Should any symptoms of gastric or intestinal derangement be present, it would, of course, be of the greatest importance to remove such; for this cause, emetics, purgatives, and mercurials might be indicated; or in some cases of atonic gastric dyspepsia, the bitter infusions, carminatives, alkalies, and stomachic aperients. "The Russian peasants are said to cure this disease in a week, or fourteen days at most, by drinking a decoction or infusion of the centaurea cyanus, without sweetening. Probably other bitter infusions might answer as well."

The avoidance of the exciting cause is of the greatest importance; the eyes should therefore be effectually shaded from the influence of the excess of light (when the exciting cause) by a deep green shade; and the patient should be removed, if possible, from the injurious effects of the brilliant glare from a powerful vertical sun, to a more genial climate. Mr. Broomfield tells us that what he ultimately found most useful was, in addition to the use of aperient medicine, the application of blisters to the temples, of the size of a crown, or a half crown piece, near to the external canthus of the eye. Should the disease still continue in any considerable degree, after five or six blisters have been applied, two, one on either temple, may be kept discharging, till a cure is completed, which usually occurs within a fortnight.

Bleeding and mercury are but rarely necessary in genuine hemeralopia; circumstances, however, might demand one or both of these remedies, especially in plethoric individuals.

Strychnine may be tried when hemeralopia depends on the excessive stimulus of light during the day, should other treatment fail, and there is no indication of inflammation or of sthenic hyperæmia.

In the symptomatic or scorbutic hemeralopia, we must defer the use of blisters to the temples until the constitutional disorder has been relieved by the use of fresh animal and vegetable food, with citric acid, or lemon, orange, or lime juice; since the night-blindness usually ceases on the correction of the scorbutic disease, and the application of blisters would probably produce scorbutic ulcers.[1]

Section III.—*Nyctalopia.—Day Blindness.*

Nyctalopia, or visus nocturnus, is an affection in which objects appear indistinct, or are altogether invisible during daylight, but the sight returns as soon as the day is down, and in the diminished light of evening and night is quite perfect.

If such an affection as this exists as a distinct disease of the

[1] I have seen a patient who dated the commencement of the hemeralopic symptoms as far back as she could remember; she herself believed them to be congenital.

retina, not as symptomatic of other affections, it is extremely rare; but, as symptomatic of other affections, it is by no means uncommon: thus a central opacity of the cornea, by obstructing the passage of the rays of light into the interior of the eye when the pupil is contracted, is necessarily attended with a greater or less degree of imperfection of vision during the continuance of bright daylight, in proportion to the extent and density of the opacity, but vision is in a certain measure restored when the pupil is dilated by the dusk of evening.

The albino is unable to distinguish bodies during the day, in consequence of the deficiency of the pigmentum nigrum, which renders the eye morbidly sensible to the influence of light; they can scarcely open their eyes in bright sunshine, and during the day they are obliged to close their palpebræ, and contract their brows; but as twilight approaches, they are able boldly to open their eyes, and then see distinctly.

The intolerance of light (photophobia) and the spasmodic contraction of the orbicular muscle during day-light (blepharospasmus), which so frequently occurs in strumous children, probably from strumous dyspepsia, disappears completely in the imperfect light of evening, and the child sees perfectly. The intolerance of light, likewise, arising from chronic retinitis in great measure disappears, at all events is mitigated in the dusk of evening, and the patient regains the power of distinguishing objects, though but imperfectly.

Mydriasis or dilated pupil, and the opposite state, myosis or contracted pupil, induce a nyctalopic affection; the former admits too much light and dazzles the patient during the day; the other, on the contrary, admits too little during the continuance of bright light to enable the patient to see distinctly, but it dilates towards evening, and thus vision is restored.

Persons who have been confined in the dark for a length of time, on returning to the light of day occasionally become nyctalopic. Baron Larrey relates the case of an old man, a galley slave at Brest, who had been confined for thirty years in a subterraneous dungeon. His long residence in the dark had such an effect on his vision, that on returning to the light, he could only see by night, and was completely blind by day.

Ramazinni remarks, "I have repeatedly observed among our country people, and especially in boys, a thing sufficiently strange. In March, about the equinox, boys about ten years of age were affected with a great degree of weakness of sight, so that through the whole day they saw little or nothing, and wandered about the fields like blind people; but when night came, they saw again distinctly. This affection ceased without any remedy, and by the middle of April, the patients were completely restored to sight. I frequently observed the eyes of these boys, and found the pupils much enlarged."[1]

[1] De Morbis Artificum, p. 363.

Boerhaave mentions the case of a man who could read during the night when he had drank too freely. Richter saw a man who had an inflammation in the eye, in consequence of a blow, who could read in a dark night. A woman who had suppressed menses, was blind during the day; the pupils becoming so contracted in a clear light, that they almost disappeared. As soon as the menstrual discharge returned, the disease subsided."[1]

Section IV.—*Amaurotic Cat's Eye.*

A peculiar pale gray or yellowish red metallic appearance, which is concave, and seen at the fundus of the eye in certain directions, and in a feeble light, similar to a cat's eye when seen in the dark, is the amaurotic affection which Beer has named "Amaurotic cat's eye." He observes that a pale gray, or whitish yellow opacity, sometimes with a reddish cast in certain lights, is developed in the bottom of the globe, far from the pupil. The sight is not merely weak, but in the strictest sense confused; for all objects, particularly those of smaller size, seem to run together, when the patient attempts to survey anything attentively. As the disease proceeds, the bottom of the eye becomes clearer and more visible, and the colour of the iris paler, the latter change being particularly obvious in dark eyes. When sight is completely extinguished, we may discern, on close inspection of the pupil, a fine vascular network over the opacity, being apparently the ordinary ramifications of the arteria and vena centralis rendered visible on the shining opal-like fundus of the globe. Such an eye, when seen in particular directions, has a yellowish or reddish luminous appearance in twilight, resembling in some degree that of the cat, whence he has derived the name.[2]

Beer supposes that vision is seldom entirely lost, but almost constantly remains stationary in the form of a more or less considerable amblyopia; but it has always proceeded, within the observation of Mr. Lawrence, to complete loss of sight.

According to Beer, the affection is confined to thin, dwindled, aged, gray-headed subjects, or but rarely occurs in emaciated atrophic children, and as a consequence of violent injuries of the globe. "A bright yellow discolouration of the pupil, with inequality of surface, sometimes remains," says Mr. Lawrence, "in the latter cases, after violent internal inflammation, and the globe becomes atrophic. This effusion of lymph, consequent on high inflammation, is a case quite distinct from the disease just described."

The peculiar deep-seated shining appearance in amaurotic cat's-eye," is dependent, at least in all probability, on organic changes of the retina and the membrane of the pigment, although the subject

[1] Wardrop's Morb. Anat., vol. ii. p. 162.
[2] Lehre, vol. ii. p. 495—498.

has not been elucidated by dissection. Beer observes that so obscure are the causes of this amaurotic disease, that whatever may be offered upon the subject, must necessarily be received as a conjecture.

The early stage of fungus hœmatodes, which presents a metallic shining opacity at the fundus of the globe, might, without due attention to its appropriate symptoms, be mistaken for cat's-eye.

"This disease," says Mr. Tyrrell, "is extremely rare; the few examples that I have seen of it, have been in males. The first case which came under my observation, was in a boy about ten years of age, of healthy aspect and make; his parents stated that he was blind, that he had been so for some time, and that the loss of vision had been gradual. He had a somewhat vacant countenance, which was the only circumstance that indicated his loss of vision; for when I examined his eyes by the aid of a strong light, I could not detect any change in texture or function which could account for amaurosis; the humours appeared perfectly clear, the iris healthy, most active in its motions, and obedient to the influence of light. From these circumstances I suspected that the boy was feigning blindness, but kept my suspicions to myself, and ordered some simple medicine; he was brought two or three times to me before I detected the nature of the complaint, and this I did accidentally. He was standing a few feet from me, among some other patients, in a situation shaded from the bright light admitted by the window, when I observed a brilliant metallic reflection from the pupils of his eyes, such as would take place from a cat's-eyes similarly placed; upon his being brought into a clear bright light this appearance could no longer be discerned; but when he was again placed in a shaded part of the room, at a distance of a few feet from me, it became again evident. When the pupils were dilated by belladonna, scarcely any morbid appearance could be seen, so long as the eye was exposed to a clear bright light; but the metallic reflection was brilliant, and readily perceived in a moderate light at a short distance, whilst, on close inspection, it always disappeared.

"The patient attended for several months at the infirmary, and mild alterative treatment was adopted but without any advantage, or any increase of morbid appearance."[1]

Dr. Mackenzie speaks of another affection of the eye, "in which the reflected and varying light seems to come from the front of the crystalline capsule, and presents a close resemblance to the reflection from a piece of opal, a mineral popularly called cat's-eye. In the cases in question, when we view the eye directly in front, the appearance is merely that of a brownish opacity; but whenever the patient looks upwards, the opalescence becomes very striking, presenting almost a glittering or silvery reflection."[2]

[1] Cyc. of Pract. Surgery, vol. i. p. 85.
[2] Pract. Treat. edit. 2, p. 834.

Little or nothing is to be expected from treatment; since we are unacquainted with the proximate cause of this affection, our prognosis cannot be but unfavourable, for under any treatment the disease usually proceeds to complete blindness. The principal intention of treatment in amaurotic cat's-eye, is to improve the general health, and, if possible, to check the disease by mild purging and alteratives, and by counter-irritation in its vicinity.

"The following case," says Mr. Lawrence, "of this affection, which is uncommon, came under my observation at St. Bartholomew's Hospital, in December, 1831. Ann Milling, twenty-five years of age, of spare habit, dark complexion and hair, and brown irides, has usually enjoyed good health, living in service, and not using her eyes in any occupation likely to be injurious. Seventeen months ago she began to observe a mist or cloud floating before the left eye; in twelve months the sight was entirely gone. She has experienced no pain. The iris is darker than in the opposite eye; it moves in harmony with the other, but has lost its independent action, excepting a slight oscillatory movement. The pupil, which is of natural size, presents a deeply-seated brownish yellow discolouration, which occupies uniformly the whole fundus of the globe, whether observed in the dilated or contracted state of the aperture. Vision is totally extinct. The general health is good." [1]

Section V.—*Myopia.*

Myopia, or near-sightedness, depends usually on an excessive refractive power of the eye, by which the rays of light are brought to a focus before they reach the retina. In every eye there is a certain distance at which objects are best seen, this distance varying a little in different eyes, sometimes even in the two eyes of the same individual. This distance, in well constructed ordinary eyes varies from fifteen to twenty inches, or in some individuals a little on either side of the scale. When a person requires to place an object much nearer to the eye than the average point, in order to obtain distinct vision, he is said to be myopic or near-sighted.

Myopic individuals rarely display this peculiarity in any marked degree till puberty, although it is probable that, in a minor degree, the affection is sometimes congenital.

To examine any object carefully, the patient is obliged to bring it very near to the eye; in some cases only a few inches from it; he closes his eyelids in a considerable degree, contracts his brows, and compresses the eyeball with his lids. In endeavouring to see distant objects, the patient likewise contracts his brows, and partly closes his eyelids, although he is unable to distinguish the countenances of friends across the street, or inscriptions over doors, &c.

[1] Loc. Cit. p. 564—565.

It is stated that near-sighted people see better through a pin-hole in a card, &c. than by the naked eye.

When excessive convexity of the cornea is the proximate cause of myopia, the individual places the object which he desires to view obliquely towards the eye, in order that the rays of light may fall on the least convex part of that tunic. It is for a similar reason that near-sighted persons see best, and at a greater distance, in a bright light, owing to the contraction of the pupil which is thus produced, and the consequent exclusion of all the rays of light except the direct. When the near-sightedness depends on excessive convexity of the cornea, the eye is prominent, preternaturally convex, and the anterior chamber evidently of a larger size than natural.

The myopia which necessarily results from conical cornea, and from dilated pupil, (mydriasis),[1] do not properly belong to the subject of near-sightedness, being themselves separate affections.

The sight of myopic individuals is good and perfectly distinct when objects are placed sufficiently near the eye; and it is said that they can read small print even easier than those whose sight is quite natural, a fact which has given rise to the popular notion of the eyes of near-sighted people being stronger than those of other individuals, in whom no defect exists. "This opinion," says Mr. Middlemore, "is not, however, strictly correct, the real strength of the eye is neither increased nor diminished by the mere circumstance of its being the seat of a myopic defect, but, as the cornea becomes flattened by age, and as the organ is less firm, tense, and plump in very old age than in early life, the increased refraction of light is, to a certain extent, remedied by the supervention of those changes in the eye usually connected with extreme senectitude."[2] We may enquire, does sight improve, as regards the distance at which objects are distinctly seen, by those changes in the figure and consistence of the eyeball which usually occur in old age, in myopic individuals? Mr. Lawrence observes, "the eye, in the progress of age, becomes presbyopic, and it might be supposed that this natural change in the organ would remedy the excess of refractive power in the near-sighted, and enable them to dispense with their convex glasses; but this is not the case; the near-sighted continue so in old age. I have know several instances, in which myopic persons were still obliged to use their concave glasses, although greatly advanced in years." Mr. Ware likewise

[1] I have seen a case of mydriasis, where extreme dilation of the pupils seemed to be almost the only apparent pathological condition present, producing near-sightedness in a very considerable degree, and some obscurity of vision; the pupils were insensible to the influence of light; the sight was nearly perfect, when objects were viewed very near. This affection arose and advanced without any obvious exciting cause: there was no headach, nor any marked sensation any where; nor did the patient complain of any thing, save the myopic condition of vision.

[2] Treatise, &c. p. 207.

remarks, that "the instances are few, if any, in which, if the use of concave glasses has been adopted, increasing years have either removed or lessened this imperfection."[1] His observations, in another part of the same tract, show that the range of vision, which is comparatively confined originally in the near-sighted, becomes still more limited in advancing years. Neither is there any ground for the notion that near sight is strong sight.[2]

There is reason to suppose that myopia may be induced by several employments, where the eyes are exercised much on minute objects, or bodies requiring careful and attentive inspection. It is in this way that literary characters, clerks who are employed constantly in writing, watchmakers and other mechanics, become myopic, whilst sailors and others much employed in the careful inspection of distant objects, not unfrequently become sufferers from an opposite defect, they become far-sighted or presbyopic. "This effect of habit," observes Mr. Middlemore, "on the refractive power of the eye, must be borne in mind as constituting a most important fact in the treatment of myopia and presbyopia; and, when speaking of the treatment of the mode of remedying these defects, we shall take advantage of that circumstance, in deciding upon one part of our treatment."[3] Mr. Lawrence, in once attending a book sale, was struck with the number of gentlemen wearing spectacles, and having counted them, he found, that out of twenty-three, twelve of the number had spectacles on. (p. 578.)

As regards the frequency of myopia in the different ranks of society, it has been remarked that it is much more uncommon in the lower classes than in the higher, which Mr. Ware surmises may arise from their not resorting to means in order to remove so slight an imperfection, or owing to their habits and employments, by which it is removed by their constant exertions to distinguish remote objects. That the disease is very uncommon in the army among the privates, or in those men who are enlisted as recruits, may be ascertained by the following observations of Mr. Ware. "I have enquired, for instance," he observes, "of the surgeons of the three regiments of foot-guards, which consist of nearly ten thousand men; and the result has been, that near-sightedness among the privates is almost utterly unknown. Not half a dozen men have been discharged, nor half a dozen recruits rejected, on account of this imperfection, in the space of nearly twenty years; and yet many parts of a soldier's duty require him to have a tolerably correct view of distant objects." "I pursued my enquiries at the military school at Chelsea, where there are thirteen hundred children, and I found that the complaint of near-sightedness had never been made among them until I mentioned it; and there were then only three who experienced the least inconvenience

[1] Tracts on the Eye, p. 230.
[2] Loc. cit. p. 581.
[3] Middlemore's Treatise, vol. ii. p. 206.

from it. After this, I enquired at several of the colleges in Oxford and Cambridge; and though there is a great diversity in the number of students who make use of glasses in the various colleges, they are used by a considerable proportion of the whole number in both universities; and in one college in Oxford, I have a list of the names of not less than thirty-two out of one hundred and twenty-seven, who wore either a hand-glass or spectacles, between the years 1803 and 1807."[1]

Mr. Ware has also remarked that the greater number of persons with whom he has conversed, had the right eye more affected than the left; a difference which he thinks may not improbably arise from the habit of using a single concave hand-glass, which, by its being applied to the right eye more commonly than to the left, renders it myopic to a greater extent than the left one.

Myopia is rarely observed to occur to any extent before puberty, when, if it previously existed, it is much increased. Mr. Lawrence remarks that "the defect may exist previously, without being noticed, as young persons do not attend minutely to the state of their sight, or compare accurately their own vision with that of others." (p. 579.) From the supposition of a too rapid and irregular developement of certain parts of the eye, at the period of puberty, Mr. Guthrie has suggested the regular and frequent employment of local depletion, by leeches applied to the eye-lids. Myopia occurring suddenly at any period of life, is generally merely a symptom of cataract, or of some form of amaurosis.

Proximate causes.—We usually observe an unnatural convexity of the cornea in myopic eyes, the anterior chamber is very large, the iris unusually distant from the cornea, and, more rarely, even concave towards that tunic. In some cases the cornea is preternaturally thick and dense, as may be one or all of the other transparent media of the eye; the lens may be unusually convex; the eye-ball elongated in an excessive degree; or, lastly, the lens may be placed too near the cornea. The effect of any one or of all these pathological conditions, would be to collect the rays of light to a focus at some place anterior to the retina; and thus, in consequence of the morbidly increased refractive power of the organs, to induce near-sightedness. A myopic eye possesses the power of adaptation to distances, although in an imperfect degree, when compared to a strong and healthy eye. Dr. Smith remarks that "if short-sighted people can read a small print distinctly at two different distances, whereof the larger is but double the lesser—which I believe most of them can do—it follows that as great alteration of figures is made in their eyes, as in perfect eyes, that can see distinctly at all intermediate distances between infinity and the larger of those two. And this is the reason that a short-sighted person can see distinctly at all distances, with one single concave of a proper figure; which otherwise must have been differently figured,

[1] Tracts on the Eye, p. 201—2.

for different distances. It follows, then, that the cause of short-sightedness, is not a want of power to vary the figure of the eye, and the quantity of refractions; but that this whole quantity is always too great for the distance of the retina from the cornea."[1]

Treatment.—When once myopia has become a confirmed defect, from whatever cause it has arisen, the only mode of remedying it is by the judicious employment of concave spectacles or glasses. But when an imperfect degree of this affection only is induced by trying employments of the eyes, a great deal may be accomplished towards its removal, or at least its amelioration, by the avoidance of the exciting causes, by passive employment of the organs on large and distant objects, and by the employment of moderately concave glasses, when the individual wishes to examine any object with greater attention. It is especially injurious in myopia, to exercise the eyes much on minute objects, or on bodies requiring much exertion and straining of the eyes; but passive exercise, such as is afforded by the contemplation of the natural and artificial beauties of the country, has no inconsiderable power in lessening the defect itself.

In selecting concave glasses, the patient will do well to avoid choosing them with too great a degree of concavity, as they would soon cause aching and weariness of the organs, and, in a few months, would require to be changed for glasses with a still more considerable concavity, owing to the increase of the myopic affection. The patient should be provided with two pair; one in which the glasses are left concave, for passive vision; and the other, with more concave glasses, for reading, or, in fact, for viewing any small bodies carefully. Mr. Lawrence observes, that as there is some reason for concluding that the optical powers of the eye accommodate themselves to the circumstances under which vision is habitually exercised, he would recommend near-sighted persons not to wear spectacles constantly, but only to use them on occasions when they more particularly require such assistance. When they have been worn for a considerable time, the person does not at first see so well on leaving them off, as he did before; but this is only temporary. (p. 580.)

The chief object, in regard to the treatment of myopia, therefore, is to diminish the excessive refractive power of the eye by concave glasses, adapted to the degree of near-sightedness, avoiding lenses, the degree of concavity of which, after short exercise, produces weariness and dazzling of the eyes; not unnecessarily to strain the eyes on minute objects, or to use a single hand-glass: and lastly, to avoid the use of glasses altogether, as much as possible. With these precautions glasses may be used with great advantage and comfort to the patient, and without any dread of injury to vision: "Indeed," observes Mr. Lawrence, "the easy exercise of vision,

[1] Complete System of Optics, vol. ii. p. 2.

with the requisite optical aid, seems to me less hurtful, than the straining and effort to do without it."

Sect. VI.—*Presbyopia.*

Presbyopia (πρεσβυς, an old man) is a defect of vision which is natural to old people, and arises from an opposite condition of the eyes to that which produces myopia, namely, diminished refraction. The eyes of old people become smaller, flatter, softer, and the cornea less convex; the iris approaches the cornea in consequence of the diminution of the anterior chamber, and the eye sinks in the orbit from these changes, and from the absorption of the orbital adipose substance. The eye in consequence refracts the rays of light imperfectly, and the rays, instead of meeting at a focus at the retina, would unite at some point behind it; the necessary consequence of which is presbyopia or far-sightedness. The rays of light are the more divergent, the nearer an object is placed to the eye; whilst, on the contrary, the farther they are the more they approach to the parallel direction, a fact which amply explains why old people are presbyopic.

At the age of about forty-five to fifty, persons begin to discover that they see near objects less distinctly than usual, especially by artificial light, so that they require the light to be increased, and the object to be placed at a greater distance from the eyes. Persons usually discover this imperfection of vision, in the first place, by the difficulty that they experience in threading a needle, nibbing a pen, reading a book of small print, or in exercising the eyes on any other small bodies which require near and clear vision; but, on the contrary, these same individuals still continue to see distinctly the hands of some distant clock, inscription, or in fact any large and distant object.

Presbyopia is found to depend on exactly the opposite pathological conditions of the eye-ball to those which give rise to myopia; thus, as regards the cornea, it may be preternaturally flat, its texture thinner, and less dense in its structure than natural; the lens may be located morbidly near to the retina, and it may be less convex than in an healthy eye; the various transparent media may have their density greatly diminished, and the whole globe may be flattened, and soft and yielding to the touch.

Other causes besides age may render the individual presbyopic; for instance, the habitual employment of the eye on large and distant objects, as in the case of sailors, &c.; or by the removal of the crystalline lens from accident, or intentionally for the cure of cataract.

Treatment.—The palliative employment of glasses constitutes the only means in our power of remedying this defect. In selecting convex lenses, as in myopia, they should assist without wearying and straining the sight, and should be worn as little as possible;

while more powerful lenses should be worn only when it is necessary to employ the eyes on such objects as require much attention; but the greatest injury may be inflicted by the excessive use of the eyes on any minute objects.

Sect. VII.—*Inability to distinguish certain Colours.*

Inability to distinguish certain colours is a congenital defect of vision, and is not unfrequently hereditary. "Several branches of a noble family in this country have been remarkable for having it."[1] A person affected with this peculiarity, in viewing a painting for example, sees and distinguishes a difference in some of the colours,—variations in the lights and shadows,—without being able to discriminate the separate colours. In some cases certain colours only are perceived, and all others are referred to one or other of these.

He has a distinct perception of colours purely yellow or blue, such as gamboge separately or when lying amongst other colours; and all other colours seem to him only modifications of these. The colours which appear in the solar spectrum, for example, are to him only two, viz., blue and yellow, whereas, to a perfect eye, there appears in that image to be seven.

He experiences great difficulty in distinguishing the different kinds of green, most of those modifications of colour called green appearing to him either yellow or blue, in proportion as one or other of these colours predominates. Grass appears to be yellow, generally not so light as gamboge, but near the colour of an orange; and, if a piece of red cloth, and another of the colour called olive, be presented to him, though he can perceive some difference between them when they are both together, yet, when seen separately, he continually mistakes one for the other. The appearance of green to his eye depends in some measure upon the quantity of light which falls on objects of that colour; some kinds of green cloth, when the sun shines strongly upon them, appearing yellow; but, in a shaded place, and even in common day-light, they appear like an impure blue.

The different kinds of red create in him equal embarrassment; for vermilion, and all the varieties of red which incline to that colour, appear to be yellow, whilst carmine, and all the reds which incline to that colour, appear to him to be blue. An officer's red coat, for example, appears to him to be yellow, and his sash blue. Red-ink, when fluid, appears yellow; and, when washed on paper and dried, it appears blue.[2]

This imperfection of vision, as regards colours, may exist in an eye otherwise strong and healthy, and of natural appearance. The

[1] Wardrop's Morb. Anat. p. 213.
[2] Wardrop's Morb. Anat. of the Eye, p. 211, 212.

sight may be otherwise good, and indeed, even clearer than usual. A person with this defect, describing his symptoms, observes, "I see objects at a greater distance and more distinctly in the dark, than any I recollect to have met with; this I discovered many years before I was aware of my defective error in colours."

In the ninth volume of the Medico-Chirurgical Transactions is a case of this affection; the writer observes, "My eyes are gray, with a yellow tinge round the pupil. The colour I am most at a loss with is green, and in attempting to distinguish it from red, it is nearly guess-work. Scarlet in most cases I can distinguish, but a dark bottle green I could not with any certainty tell from brown. Light yellow I know; dark yellow I might confound with light brown, although in most cases I think I should know them from red. All the shades of light red, pink, purple, &c., I call light blue: but dark blues and black I think I know with certainty. Though I see different shades in looking at a rainbow, I should say it was a mixture of yellow and blue, yellow in the centre, and blue towards the edges. I have red crimson curtains in the window of my bedroom, which appear red to me in candle-light, and blue in day-light. The grass in full verdure appears to me what other people call red, and the fruit on the trees when red I cannot distinguish from the leaves, unless when I am near it, and then more from the difference of shape than colour. A cucumber and a boiled lobster I should call the same colour, making allowance for the variety of shade to be found in both; and a leek in luxuriance of growth is to me more like a stick of red sealing wax than any thing I can compare it with."

Many members of the same family are frequently affected in a similar manner. This defect of vision sometimes occasions many ridiculous mistakes: Dr. Nichols has related a case of a naval officer who purchased a blue uniform coat and waistcoat with *red* breeches to match the blue; and Mr. Harvey describes the case of a tailor at Plymouth, who on one occasion repaired an article of dress with crimson instead of black silk, and on another patched the elbow of a *blue* coat with a piece of *crimson* cloth. Sauvages relates the case of a delicate woman to whom there seemed to exist "atmospheram cæruleo-viridem circa omnia objecta," and when her health was relieved by the use of musk all objects appeared of a greenish colour.[1]

Causes.—Phrenologists affirm that there is "*an organ of colours*," that the power of distinguishing colours is seated in the sensorium, not in the eyes, and consequently that the inability to distinguish certain colours is depending on an affection of the sensorium. The eye receives impressions, but the power of judging of these impressions, and of understanding the relations which colours bear to each other, is the function of the sensorium only. The eyes of persons with this peculiarity are to all appearances

[1] Middlemore's Treat. vol. ii. p. 236.

perfectly sound and natural; phrenologists conclude, therefore, that the defect does not depend on any deficiency or imperfection of the eye-ball, but of that part of the brain which they have named the organ of colour. Sir John W. F. Herschell observes, "we have examined with some attention, a very eminent optician, whose eyes (or rather eye, having lost the sight of one by accident) have this curious peculiarity, and have satisfied ourselves, contrary to the received opinions, that all the prismatic rays have the power of exciting and affecting them with the sensation of light, and producing distinct vision, so that the defect arises from no insensibility of the retina to rays of any particular refrangibility, nor to any colouring matter in the humours of the eye preventing certain rays from reaching the retina, (as has been ingeniously supposed,) but from a defect in the sensorium, by which it is rendered incapable of appreciating exactly those differences between rays on which their colour depends."[1]

Mr. Wardrop, however, thinks it not improbable that this imperfection in the discrimination of colours may arise from a greater sensibility of the retina to the impression of the blue and yellow-making rays, than to those of any of the others. This he supposes may depend on the refractive powers of the humours, by which the rays of these two colours are more accurately united on the retina than rays of any other colour, and, consequently, the images formed there of objects reflecting these colours are more distinct than those formed of objects reflecting the other colours. And that when the colour of a body is compounded of several colours, the superior correctness of the image formed by the blue and yellow rays reflected from it, may cause the sensations which these colours excite to preponderate over the sensations caused by the other colours, and thus may cause in the mind of the observer the perception of that compound colour to be different from the perception of the same colour to another person, whose eye forms images of external objects differently.

Dr. Young proposes that the simplest explanation of the phenomenon is to suppose those fibres of the retina, which perceive the red-coloured rays, to be either absent or paralysed.

Dr. Brewster, again, conceives that the retina is insensible, in these cases, to the colours at one end of the spectrum, in a similar manner as it has been proved, by Dr. Wollaston, that the ears of some people are insensible to sounds at one extremity of the scale of musical notes, being, at the same time, perfectly sensible to all other sounds.

[1] Encyclopædia Metropolitana, p. 434. § 507.

Sect. VIII.—*Hemiopia.—Partial Blindness.*

Hemiopia, or partial blindness, is not an uncommon symptom in some forms of amaurosis; it may occur, however, as an independent affection.

Hemiopia is sometimes sudden in its attacks, and recurs at considerable intervals of time. The part of an object which appears dark, differs in different instances; in some cases the right, in others the left is the blind side, while at other times the upper or lower half of the field of vision is obscured. In some cases one eye only is affected, in others both; the patient may see well when looking straight forwards, within a certain angle, but nothing to either side.

Dr. Wollaston has described two attacks of hemiopia which occurred to himself, and which he had occasionally seen in others, in the Philosophical Transactions, in an article on "the semi-decussation of the optic nerves." "It is now," he observes, "more than twenty years since I was first affected with the peculiar state of vision to which I allude, in consequence of violent exercise I had taken for two or three days before. I suddenly found that I could see but half the face of a man whom I met; and it was the same with respect to every object I looked at. In attempting to read the name Johnson over a door, I saw only —son, the commencement of the name being wholly obliterated to my view. In this instance the loss of sight was towards my left, and was the same whether I looked with the right eye or the left. This blindness was not so complete as to amount to absolute blackness, but was a shaded darkness without definite outline. The complaint was of short duration, and in about a quarter of an hour might be said to be wholly gone, having receded with a gradual motion from the centre of vision obliquely upwards towards the left.

"Since this defect arose from over-fatigue, a cause common to many other nervous affections, I saw no reason to apprehend any return of it, and it passed away without need of remedy, without any further explanation, and without my drawing any useful inference from it.

"It is now almost fifteen months since a similar affection occurred again to myself, without being able to assign any cause whatever, or to connect it with any previous or subsequent indisposition. The blindness was first observed, as before, in looking at the face of a person I met, whose left eye was to my sight obliterated. My blindness was in this instance the reverse of the former, being to my right (instead of the left) of the spot to which my eyes were directed; so that I have no reason to suppose it in any manner connected with the former affection.

"The new punctum cæcum was situated alike in both eyes, when at an angle of about three degrees from the centre; for when any object was viewed at the distance of about five yards, the point

not seen was about ten inches distant from the point actually looked at.

"On this occasion the affection, after having lasted with little alteration for about twenty minutes, was removed suddenly and entirely by the excitement of agreeable news respecting the safe arrival of a friend from a very perilous enterprise."

Dr. Wollaston was led to infer that a peculiarity of structure existed in the commissure of the optic nerves, which has been confirmed by anatomical research.

Dr. Wollaston remarks, that since the corresponding points of the two eyes sympathise in disease, their sympathy is evidently from structure, not from mere habit of feeling together, as might be inferred, if reference were had to the reception of ordinary impressions alone. Any two corresponding points must be supplied with a pair of filaments from the same nerve, and the seat of a disease in which similar parts of both eyes are affected, must be considered as situated at a distance from the eyes at some place in the course of the nerves where these filaments are still united, and probably in one or the other thalamus nervorum opticorum.

It is plain that the cord, which comes finally to either eye under the name of optic nerve, must be regarded as consisting of two portions, one half from the right thalamus, and the other from the left thalamus nervorum opticorum.

According to this supposition, decussation will take place only between the adjacent halves of the two nerves. That portion of nerve which proceeds from the right thalamus to the right side of the right eye, passes to its destination without interference; and in a similar manner the left thalamus will supply the left side of the left eye with one part of its fibres, while the remaining halves of both nerves, in passing over to the eyes of the opposite sides, must intersect each other, either with or without intermixture of their fibres.

Now if we consider rightly the facts discovered by comparative anatomy in fishes, we shall find that the crossing of the entire nerves in them to the opposite eyes, is in perfect conformity to this view of the arrangement of the human optic nerves. The relative position of the eyes to each other, in the sturgeon, is so exactly back to back, on opposite sides of the head, that they could hardly see the same object; they can have no points which generally receive the same impression as in us; there are no corresponding points of vision requiring to be supplied with fibres from the same nerve. The eye which sees to the left has its retina solely upon its right side; and this is supplied with an optic nerve arising wholly from the right thalamus, while the left thalamus sends its fibres entirely to the left side of the right eye for the perception of objects situated on the right. In this animal an injury to the left thalamus might be expected to occasion entire blindness of the right eye alone, and want of perception of objects placed on that side. In

ourselves, a similar injury to the left thalamus would occasion blindness of the left half of the retina of both eyes.

A disorder that has occurred within my own knowledge in the case of a friend, seems fully to confirm this reasoning, as far as a single instance can be depended upon. After he had suffered severe pain in his head for some days, about the left temple and towards the back of the left eye, his vision became considerably impaired, attended with other symptoms, indicating a slight compression of the brain.

It was not till after the lapse of three or four weeks that I saw him, and found that, in addition to other affections which need not here be enumerated, he laboured under a defect of sight similar to those which had happened to myself, but more extensive, and it has unfortunately been more permanent. In this case the blindness was at that time and still is entire, with reference to all objects situated to the right of his centre of view. Fortunately the field of his vision is sufficient for writing perfectly. He sees what he writes, and the pen with which he writes, but not the hand which moves the pen. This affection is, as far as can be observed, the same in both eyes, and consists in an insensibility of the retina, on the left side of each eye. It seems most probable, that some effusion took place at the time of the original pain on that side of the head, and has left a permanent compression on the left thalamus. This partial blindness has now lasted so long without sensible amendment, as to make it very doubtful when my friend may recover the complete perception of objects of that side of him.

In another case which Dr. Wollaston details towards the end of his paper, he observes, one of my friends has been habitually subject to it for sixteen or seventeen years, whenever his stomach is in any considerable degree disordered. In him the blindness has been invariably to his right of the centre of vision, and from want of due consideration has been considered a temporary insensibility of the right eye; but he is now satisfied that this is not really the case, but that both eyes have been similarly affected with half-blindness. This symptom of his indigestion usually lasts about a quarter of an hour or twenty minutes, and then subsides, without leaving any permanent imperfection of sight.

Dr. Wollaston died about four years after publishing these observations, and it was discovered on post-mortem examination that the optic thalamus of the right side was much enlarged, and that but little of its natural structure remained except a layer of medullary matter on its upper surface. The right thalamus was converted into a tumour as large as a middle sized hen's egg, and towards its circumference it was of a grayish colour, a caseous consistence, and its structure much firmer than the brain itself; but, on the contrary, towards the centre of the mass, it was in a half-dissolved condition, of a brown colour, and remarkably soft. The corpus striatum was likewise affected, and the right optic nerve

was very soft, of a brownish colour, and more expanded than natural where it passes on the outside of the thalamus.

Treatment.—When hemiopia occurs suddenly with symptoms of determination of blood to the head, and some slight derangement of the circulation within the cranium, the treatment proper for apoplexy is here indicated; viz., general and local abstraction of blood, cold applications to the head, active purgation, and absolute quiet, used more or less actively in proportion to the violence of the case. But a frequent cause of this affection is disturbance of the digestive organs; in such a case the treatment required for the dyspeptic symptoms is likewise proper for the hemiopia. Hemiopia may occur as a symptom of organic disease of the brain requiring peculiar treatment.

Section IX.—*Ocular Spectra.—Muscæ Volitantes, and Photopsia.*

A false perception of light (photopsia), as of sparks, flashes of fire, and other luminous bodies floating before the eyes, are induced by certain conditions of the retina and brain; but such appearances, however, may occur independently of disease, as from a blow on the eye, in sneezing, and from galvanic influence. "If a piece of silver be placed *upon* the tongue, and a piece of zinc *under* it, no effect is observed whilst the metals are kept apart; but, if their ends be brought into contact, we immediately perceive a saline taste, and a peculiar sensation, somewhat resembling a very slight electric shock; sometimes, also, when the surface of the metals is extensive, a flash of light appears to pass before the eyes. This latter effect may be more certainly produced by placing one metal between the upper lip and the gums, and the other upon the tongue, and bringing their ends together as before."[1] This phenomenon succeeds as well in the dark as in the light, whether the eyes be closed or open.

Photopsia is frequently a symptom of acute and chronic inflammation of the retina, or of active hyperæmia. In plethoric individuals it is common for them to see showers of luminous bodies on stooping, or in any way impeding the free return of blood from the head.

Muscæ volitantes.—Muscæ volitantes, or the appearance of minute bodies of a great variety of shape, size, and number, appear to move before the eyes in different directions, between them and surrounding objects. Although most frequently but symptomatic of amaurosis or cataract, they occur occasionally as a consequence of dyspepsia, unconnected with any other imperfection of vision. In some cases muscæ volitantes exist as a distinct affection for years,

[1] Brande's Manual of Chemistry, 4th edit. Pt. I. 253.

it being difficult or impossible to remove it; whilst more rarely it is congenital.

When the appearance consists of a dark fixed spot it is called scotoma.

Muscæ volitantes rarely occupy the centre of vision, they are either to one side, or below, or above it: they assume a variety of forms resembling most frequently semi-transparent globules with an opaque centre or outline, sometimes they are black spots, or lines interrupted by spots, being either straight, or angular, twisted, waved, or united in various ways. Again, muscæ volitantes sometimes resemble insects, as flies, spiders, or worms; occasionally they are like spiders' webs, gauze, net-work, or streaks, or they may have a metallic appearance like globules of mercury, or be perfectly transparent like glass.

The patient most readily perceives these appearances when he looks on light and clear objects, more especially when they are distant, as the sky when clear and serene, or at white paper on a wall on which the sun is shining, or when he looks at any well illuminated object. The spots appear to ascend, and then to descend on any sudden motion of the eyes, such as looking upwards towards the sky, and fixing the eyes there for a short time. But "in proportion as the object looked at is near, the less distinct the spectra are, and when at the nearest point, they entirely disappear."

Muscæ are fixed or moveable; sometimes there is a single dark spot (scotoma) which always occupies the same part of the field of view, moving with the eye, and presenting before any object at which the individual looks.

The spectra which are fixed are so called, because they always keep the same position, in respect to the axis of vision. If a person with these spots keeps his eyes unmoved, by looking steadily at the corner of a cloud, at the same time that he observes the spectra, he will be convinced that they have no motion but what is given to them by the eye in pursuit of them.

Those spectra which are moveable float about even when the eye is stationary, and are sometimes above, below, or at the side of the axis of vision; but they are never in it. These are sometimes seen when the eyelids are closed. [1]

The duration of muscæ is extremely various; they may remain a few hours, or years, or even be more permanent. On their first appearance, they are usually but slight and evanescent, but subsequently become more durable, and increase both in number and size. When very numerous, they interfere in some measure with vision, and greatly annoy the patient; they may even reach such a degree "that the patient compares his vision to looking through a riddle."

Muscæ may appear in one or both eyes, sometimes only one is affected. It is said that myopic persons are least liable to this affec-

[1] Wardrop's Morb. Anat., vol. ii. p. 238.

tion. But muscæ are invariably increased by much exercise of the eyes, so as, not unfrequently, to become so troublesome after a short time, as to compel the patient to desist.

Causes.—The exciting causes of muscæ, when occurring as an independent affection, may be uterine or abdominal irritation, over-exertion of the organs themselves, mental excitement, but especially the depressing passions, as fear, anxiety, overwhelming grief, &c., or partial compression of the retina from congestion, active or passive.

Proximate causes.—It is extremely doubtful, and as yet undecided, what is the true proximate cause or causes of muscæ. Mr. Wardrop says that "these ocular spectra arise from different causes, and depend either on a morbid condition of the retina, or an opacity of some parts of the eye which are naturally transparent. In the latter case the opacity must be in the posterior part of the vitreous humour, because experiments, and the principle of optics, prove that no opacity of the aqueous, crystalline, or anterior part of the vitreous humour can throw a partial shade on the retina." (vol. ii. p. 239.)

Many circumstances disprove that turbidity of the humours, or the presence of minute bodies in them, could produce the phenomena of muscæ, since opacities of the cornea, fragments of opaque lens, or indeed opaque points in any part of the eye anterior to the retina, do not give rise to impressions as defined as the generality of ocular spectra, although muscæ occur in cataract.

Willis and Darwin attributed the affection to insensibility of some of the fibres of the optic nerve.

Mr. Ware observes, that it seems probable that muscæ volitantes depend on a steady pressure on one or more points of the retina, which are situated near the axis of vision, but not exactly in it.

It seems probable that scotoma depends on an insensible point of the retina, whether resulting from a deficiency of the medullary layer at that point, or not. Mr. Travers attributes scotoma to an organic affection produced, probably, by an extravasation between the choroid and retina, compressing to a certain space the papillæ of the retina, to which the musca corresponds in figure. It is, in other instances, independent of deranged structure, and may be presumed to be only an insensible point on the retina. "I am confident," says Mr. Middlemore, "that I have been able, in many instances, to refer the existence of scotoma to an insensible point of the retina of a very limited extent." (p. 223, vol. ii.)

Dr. Mackenzie thinks it probable that both the semi-transparent and the dark muscæ are generally owing to a dilation of the branches of the arteria centralis retinæ, or of the corresponding vein.

But there are ocular spectra, as Dr. Darwin observes, which are derived from another source. After looking at any luminous object, as the sun, for a short time, so as not to fatigue the eye very much, part of the retina becomes less sensible to the smaller quantities of light. Hence, when the eye is turned in less luminous

parts of the sky, a dark spot is seen resembling the space of the sun. It must, therefore, be from habit and want of attention, that we do not see such spots in all objects every hour of the day.[1]

When muscæ volitantes are unaccompanied by any amaurotic symptoms,—the pupil being clear and possessing its natural colour, if the motions of the iris are extensive and natural, the vision of the patient being quite perfect, so that he is able to distinguish even very minute objects, has not either headach or pain in the brow or eye,—the muscæ are quite harmless, neither is there any danger of loss of vision.

Treatment.—The chief indication of treatment is to improve the general health and to remove any cause of irritation; to avoid over exercising or straining the eyes, and especially to pay great attention to the digestive organs, and to sustain a lax condition of the bowels by mild stomachic aperients. It has been recommended to foment the eyes two or three times daily with a strong infusion of camomile flowers, or the herb eye-bright, or to bathe the temples, forehead, and outside of the eye-lids with eau de Cologne, camphorated spirits, or Hungary water; at all events they can do no harm, and may do good by their gentle astringent action on the conjunctiva.

Sect. X.—*Strabismus and Luscitas.*

When both eyes are capable of motion, but the axes of both are not directed towards the same object when the individuals look at any thing, strabismus or squinting is said to be present. This defect may exist in one eye only, or in both at the same time; the direction of the squint may be outwards (strabismus divergens), or inwards towards the nose (strabismus convergens); very rarely it is upwards, or upwards and outwards. When one eye only is affected, if the sound eye be covered the other resumes its natural direction, and can be moved in any and every way, as the sound eye, in obedience to the will, as long as the sound eye is covered; but as soon as it is uncovered, the affected eye resumes its squint, and can be directed no longer in the same axis with the sound one. The same phenomena are observed if both eyes squint, so that one of them be covered.

Double vision is frequently the consequence of strabismus, when recent and slight, in consequence of the want of correspondence in the movements of the two eyes; so that the image of anything being depicted on parts of the retinæ which do not correspond, a double impression, and consequently double vision, is the necessary consequence.

When both eyes are affected with strabismus, the patient's vision

[1] Wardrop's Morb. Anat. vol. ii. p. 241, 242.

is very confused and imperfect, and he is myopic, independently of any defect in the organs themselves; although frequently, when one of the eyes only squints, the organ is found to be an imperfect eye, and its vision to be very defective.

The degree of strabismus varies exceedingly in different instances, being so slight, in some cases, as to be scarcely perceptible, —in which case the patient usually complains of diplopia; whilst in others, it is so considerable, as to even completely hide the cornea, and in this manner to render the eye useless. "In one instance," says Mr. Wardrop, "an eye squinted to such a degree, that not only the pupil, but the whole cornea, was hid. The other eye being quite blind, the patient could only see by turning the cornea of the squinting eye outwards, which she had acquired the power of doing, by pressing, with the point of the fore-finger, in the internal angle, till the cornea was exposed. Whilst with her finger she retained the eye-ball in this position, she could see distinctly; whereas, without this contrivance, she was perfectly blind. The squint was attributed to severe headachs, to which the woman had been subject for many years."[1]

Strabismus occurs much more frequently in children, and during infancy, from the very great excitability of the nervous system at that period of life, and the various causes of irritation to which they are exposed—viz., dentition, disorders of the digestive organs, &c. It may occur suddenly; but it is more commonly developed gradually.

Dr. Marshall Hall speaks of a spasmodic strabismus, in which the motions of the eye may be perfect, except on such occasions as when the patient is particularly excited or disordered, or from intense application or employment of the eye; then the strabismus becomes apparent, the eye-ball obviously is *drawn* in one particular direction.

These symptoms are in contradistinction to those cases which result from paralysis of cerebral and voluntary nerves, and some of the muscles of the eye-ball. In these cases, not unfrequently the patient can move the eye-ball fully, in every direction, except one; at a certain point the eye-ball stops, although the other eye continues to pursue an object placed and moved before it. This was the case with a patient, who was attended by Dr. M. Hall, for attacks of sickness, with defective vision, and motions of the eye.[2]

Causes.—The exciting causes of strabismus are numerous, and sometimes complicated: thus, it may be an hereditary or congenital affection,—or arise from imitation and habit, from improper education of the eyes, abdominal irritation, various diseases of the encephalon, long position of the head in one posture, disparity of vision in the two eyes, painful affections of the nervous system, opacities

[1] Wardrop's Morb. Anat. vol. ii. p. 216, 217.
[2] See Dr. Hall's Lectures on the Nervous System, p. 158.

of the cornea, and certain conditions of the pupil, irritation of teething, &c.; sometimes from organic diseases of the brain.[1]

Squint from abdominal irritation is most common in children; in which case, the strabismus is frequently outwards. Mr. Wardrop observes, that the state of the eye, in some instances, forms an accurate measure of the degree of derangement of the alimentary canal.

The irritation from worms occasionally produces strabismus; or worms may be complicated with a condition of the digestive organs favourable to their production.

Mr. Wardrop gives the following case of strabismus, from derangement of the primæ viæ.

Case 1.—"A lady, thirty-five years of age, who had frequently, during several years, the primæ viæ much deranged, had at last a severe attack of pain in her head, extending to the right eye; the bowels having been at this time unusually confined. The affected eye then squinted, and she had double vision. In proportion as the functions of the bowels were restored, the squint diminished; and, before the patient ultimately recovered, every stage of amendment, or occasional change, was distinctly marked by a corresponding diminution or increase in the squint." (p. 222.)

Strabismus occurs so frequently in acute and chronic affections of the encephalon, as, in some cases, to be alone sufficient to point out the seat of the disease. It is symptomatic of the comatose stage of hydrocephalus, has been known to follow fevers, blows on the head, the disordered circulation induced by or inducing apoplexy, or a tendency to that disease.

Strabismus may arise from imitation or habit; it is thus that persons, with any defect on the nose or cheek, acquire a habit of squinting, from constantly inspecting it; and children, by the imitation of individuals who are affected with strabismus.

Case 2.—"A child, two years of age, acquired a complete squint, from living a few weeks in a house where there was a young lady who squinted. In another instance, a child got a squint whilst teething; and her sister, by frequently imitating her, at last acquired the same habit. A child who suffered from a violent fit of hooping-cough during the night, was observed to squint the following morning. In a short time one of her sisters acquired a squint. I have also known instances of children squinting, whose mothers or nurses squinted."[2]

Strabismus may likewise arise from long retention of the head in one position. It has been remarked that squinting may be induced from the improper position given by nurses to a child in the cradle, so that it sees light or any object with only one eye, producing in this manner a continued action of certain muscles, whilst their antagonists are unused, and consequently weakened. Strabismus

[1] See a case of strabismus, from "Disease of the brain, tumours of the corpus striatum, and tuber annulare."—Lancet, vol. i. 1829—30. p. 561.

[2] Wardrop's Morbid Anat. vol. ii. p. 226.

divergens has been attributed to the improper practice of accustoming a child to regard two objects at the same time, placed at a distance from one another, of which he is fond; thus a child may get into the habit, whilst lying in its cradle, of viewing at one and the same time its nurse on one side, and the window on the other.

Case 3.—"A young lady was confined for several weeks to bed, with disease of the hip-joint, in a room lighted by a window on one side. She was in the habit of turning her eyes constantly to the light, and thus acquired a squint; which was easily cured by simply changing her position in the room."

"Another young person, from remaining ten days on one side, acquired a squint, which lasted seven years; it was afterwards removed by looking a great deal in the opposite direction."

We sometimes find strabismus resulting from disparity of the two eyes, original or acquired. Disparity of the vision of the eyes, however, does not necessarily produce strabismus; for persons who see much better with one eye than the other frequently do not squint; yet squinting is a frequent symptom of amaurosis. Infants occasionally squint from congenital imperfection of one of the eyes, which from its interfering with perfect vision is, by an effort of nature, turned out of the axis of vision.

A partial obstruction of the ray of light by an opacity of the cornea, which leaves an access of light on one side only, may, by causing the eye to be turned in the opposite direction, produce either strabismus divergens or convergens, according to its situation. Dr. Mackenzie observes that an "ulcer of the cornea, followed by a speck, is a frequent cause. We are in the habit of attributing the squint to the speck; but I believe the ulcer to be the true cause. A child finds that by a particular effort of the muscles, he can so turn the eye as to ease the pain attending the friction of the ulcer in the natural movements of the organ. This effort is attended by a squint, and by frequently repeating this effort, or almost constantly employing it for a time, an habitual strabismus is formed, which is often not detected till the ulcer is healed. In this case we attribute it erroneously to the speck."[1]

A similar effect may be produced, as in opacities of the cornea by displacements of the pupil either from accident or disease, or from partial opacities of the lens or its capsule. Strabismus, however, is very rare in cataract, except in congenital cases where a portion only of the pupil is obscure.

Squinting is occasionally produced from violent passions of the mind, such as fright, fear, anger, &c. "A child has been known to squint for months after a violent fit of crying. A little boy awoke in the middle of the night on board a steam-boat: he was greatly alarmed, and soon after was observed to squint. In another boy, this affection appeared in consequence of forcibly bathing him in the sea, which was persevered in for some time, notwithstanding

[1] Loc. cit. p. 305.

violent screams, and other expressions of terror."[1] These cases depend probably on some partial disturbance of the circulation within the cranium, or effusion of serum or blood. Mr. Middlemore has observed squinting to occur on several occasions after the application of a blister behind the ear, but it has never lasted long —it has not, in a single instance, been permanent when so produced.[2]

Keeping one eye covered for any length of time whilst the other is used, might produce a squint by debilitating the muscles of the closed eye; a circumstance which is said to occur frequently in children affected with strumous ophthalmia when only one eye is shaded. In most cases the squint may be removed from the one eye to the other, by shutting up, for a certain length of time, the sound eye, and making use only of the eye which squints. When this has been done, and both eyes opened, the eye which originally squinted will now be the one whose axis is directed to the object, whilst that which was sound now squints. This was strikingly illustrated in a young lady, who long had a complete squint in one eye from a corneal speck, and whose other eye was attacked with pustulous ophthalmia. The violence of the symptoms made her keep the inflamed eye covered with a shade, whilst the other, with which she saw but imperfectly, served the common purposes of life. In a few days, to the astonishment of all who knew her, what formerly was the sound eye, now became the squinting one; but, as the inflammation subsided, and as she began to make use of that eye, the squint gradually left it, and returned to the one originally affected.[3]

Treatment.—If the strabismus is the consequence of derangement of the primæ viæ it is necessary to employ emetics where the condition of the stomach indicates their use, mercurials, purgatives, or tonics, alkalies, and carminatives, according to the peculiarity of the disorder; and where there is any indication of worms, anthelmintics.

Should we fail to remove the strabismus by these means, we may sometimes succeed in effecting a cure by binding up the sound eye for a short time daily, and thus compelling the patient to use the affected eye. The time should be short, during which the sound eye is bound up, in the commencement not exceeding half an hour, which may be increased gradually until it arrives at two hours.

Another plan is that of placing the patient before us, and then bidding him to close the sound eye whilst he looks steadily at some person or thing with the affected eye, and when the eye is sufficiently fixed, then to open the sound organ. At first the eye assumes its natural squint, and the sound eye is directed towards the object; but by patient, and frequent repetition, the patient at length becomes enabled to maintain the due position of the defective eye for several minutes, and eventually to remove the affection.

[1] Mackenzie's Pract. Treat. p. 307.
[2] Treatise, Note, p. 563.
[3] Wardrop, vol. ii. p. 219, 220.

Should both eyes be affected, they must be alternately employed in this manner, or alternately blindfolded.[1]

Luscitas, or immovable distortion of the eye-ball.—Beer has given the name of Luscitas to all those cases of strabismus where the eye is fixed in its unnatural position. Luscitas usually occurs from paralysis of the muscle of the eye, or from tumours of the orbit displacing and fixing it.

Sect. XI.—*Diplopia and Monoblepsis.*

Diplopia is most frequently the result of a want of correspondence in the axes of the eyes, when it exists in a slight degree only; for when very considerable, the image is not depicted on the retinæ of both eyes at the same time, and consequently vision is single. The diplopia which results from this cause gradually wears off, in consequence of the impression on the squinting eye being at length disregarded.

Diplopia is often a symptom of amaurosis.

But under certain circumstances an object may appear double even when the eyes are perfectly healthy; thus, if a person hold the two fore-fingers in a line from his eyes, so that one may be more distant than the other, by then looking at the nearest, the more distant will appear double, and by looking at the more distant, the nearest will appear double.[2]

In diplopia the two objects rarely appear equally distinct. The real object is that which generally is plainest and most perfect, and which is first seen; the second, or false one, is indistinct and confused, so that the individual rarely makes mistakes in discriminating them.

The affection itself is of two kinds, viz., the patient either sees double with the two eyes, but naturally when one is closed, or else all objects appear double whether he regards them with one or both his eyes. The attack, duration, and symptoms of this affection vary in different instances. It may be sudden in its attacks, and

[1] Professor Rossi has invariably found the orbit more oblique than usual, in persons who were affected during life with congenital strabismus, its central axis not being perpendicular to its base. From these observations he concludes that simply directing the process of ossification would in many instances be sufficient to remove congenital strabismus. He recommends glasses which are flat, and as large as the base of the orbit, covered with black varnish to be used, where the strabismus depends on irregular muscular action, having a transparent portion in the centre of a crucial form, consisting of a horizontal and an oblique line, the latter being small on the side towards which the eye is morbidly directed, and larger on the other, the globe turning towards the side where the light is most considerable, and thus gradually correcting the abnormal direction.—*Memoirs of the Academy of Sciences at Turin.*

M. Dieffenbach has recently cured three persons affected with strabismus, by dividing some of the muscles of the orbit.—*Lancet.*

[2] Arnott's Elem. of Physics, vol. ii. p. 217.

accompanied with symptoms of apoplexy, or induced by excessive exertion of the eye, when it is frequently transitory; it may be continual or periodical, or seen only when objects are placed at a particular distance, or on one side; or lastly, in all and every direction.

Causes.—Diplopia is produced either by a want of correspondence of the axes of the eyes, from amaurosis, or from some organic change in the eye by which a double image is formed on the retina.

A double image may be formed on the retina from irregularity of the surface of the cornea, which is divided into two or more convex surfaces; a condition which may arise from ulcers of the cornea, which cicatrise, leaving the cornea diaphanous but dimpled. Irregularities of the surface of the cornea do not always produce diplopia: it seems probable that they must be of a particular shape to induce it. Beer states that the double vision arising from the altered shape of the cornea, will, if the patient is not decrepid, gradually disappear of itself, if proper care is taken of the constitution and of the eye.

An inequality of the anterior surface of the crystalline lens may produce double vision in a similar manner. M. Prevost has published an interesting history of his own case of double vision with a single eye, which he supposes to happen from a fracture, bruise, or partial flattening of the lens, or separation of its laminæ.

A remarkable and instructive instance of irregular refraction has been adduced by Professor Airy, in the case of one of his own eyes; which, from a certain defect in the figure of his lenses, he ascertained to refract the rays to a nearer focus in a vertical than in a horizontal plane. This would take place if the cornea, instead of being a surface of revolution, in which the curvature of all its sections through the axis must be equal, were of some other form, in which the curvature in a vertical plane is greater than in a horizontal.

The correction of such a defect would never be accomplished by the use of spherical lenses. The strict method, applicable in all such cases, would be to adapt a lens to the eye of nearly the same refractive power, and having the surface next the eye an exact *intaglio* fac-simile of the irregular cornea, while the external surface would be exactly spherical, and of the same general convexity as the cornea itself. The necessity, however, of limiting the correcting lens to such surfaces as can be truly ground in glass, to render it of any and every-day use, and which surfaces are only spheres, planes, and cylinders, suggested to Professor Airy the ingenious idea of a double concave lens, in which one surface should be spherical, the other cylindrical.

After some ineffectual applications to different workmen, Professor Airy at last procured a lens to his wish from an artist named Fuller, at Ipswich, the radius of the spherical surface being $3\frac{1}{3}$ inches, of the cylindrical $4\frac{1}{2}$ inches. With its assistance, he could read the smallest print at a considerable distance with the left, or defective eye, as well as with the right. He found that vision was

most distinct when the cylindrical surface was turned from the eye; and as, when the lens was distant from the eye, it altered the apparent figure of objects by refracting differently the rays in different planes, he judged it proper to have the frame of his spectacles made so as to bring the glass pretty close to the eye.

"With these precautions," he observes, "I find that the eye which I once feared would become quite useless, can be used in almost every respect as well as the other." [1]

Double vision in some cases arises from a double pupil, or from a deviation of the pupil from its natural situation, which might, in the former case, be removed by converting the two apertures into one.

Diplopia sometimes occurs from over-exertion of the retina, disturbance of the circulation of the brain, sympathy with the digestive organs, &c.

Case 1.—"A Catholic clergyman experienced a kind of double vision whilst he held down his eyes to read; the letters appearing to cross each other. This confusion ceased when he shut one eye, or when he elevated the book to the same height, or higher up than his eyes. He found, however, some difficulty if the book was placed at the same time to the left. Morgagni conceived that this arose from a weakness in the abductor and depressor muscles of the right eye."

Case 2.—"A young man was frightened and dazzled by lightning when looking at the clouds. An hour afterwards he saw double. On examining his eyes he was observed to squint."

Case 3.—"A gentleman ate a small piece of pastry between meals, and had immediately uneasy feelings about the stomach. On walking in the open air, his sight became dim, and he had double vision, accompanied with severe headach, all which went off the following day."

Case 4.—"A young gentleman had double vision, which came on three weeks after receiving a blow on the forehead. In order to remove a portion of bone which afterwards became carious, I made an incision through that portion of the integuments traversed by the frontal nerve, which was also divided. In a few days he saw single, and the eye, which was turned outwards, recovered its natural position." [2]

Sir Everard Home gives the following illustration of diplopia, from over-exertion of the eyes, in the Philosophical Transactions for the year 1797.

Case 5.—A lieutenant-colonel of engineers, who was in good health, was much surprised to find that all at once, towards evening, surrounding objects appeared double, after a fatiguing day's sport of shooting moor-game on his own estate in Scotland; his gun, his horse, the road, were all double. He was exceedingly distressed by this appearance, and alarmed lest he should not find his

[1] Encyc. Metrop. Art. Light, p. 398, § 359. Mackenzie's Pract. Treat. p. 856—8.

[2] Wardrop, vol. ii. p. 235, 236.

way home; he succeeded, however. in this, by giving the reins to his horse. After a night's rest, it was considerabiy lessened; and, after two or three days, he again went to the moors, when the diplopia returned in a more violent degree. He then went to Edinburgh for the benefit of medical advice. The disease was referred to the eye itself, and was treated accordingly; his head was shaved, and he was leeched and blistered, put under a mercurial course, and kept on very spare diet. The affection was aggravated by this treatment, and after giving it a sufficient trial, he returned home in despair, and shut himself up in his own house. By degrees he left off all his medicines, and lived as usual. During the whole time his sight was perfectly clear, and near objects appeared single, but became double at three yards; and, by increasing the distance, the two images separated farther from each other. When he viewed an object, both eyes were not equally directed towards it, as ascertained by by-standers. The double vision was almost always most violent in the morning, but became better after dinner, when he had taken a few glasses of wine. After continuing about a twelvemonth, the affection gradually disappeared.

Monoblepsis, μονος single, βλεψις sight. The term monoblepsis is applied to an affection in which vision is confused, imperfect, and indistinct, when both eyes are employed, owing, probably, to the direction of the axes of the eyes being suddenly disturbed, and diplopia, with confusion of vision, produced, but quite perfect, or nearly so, when either eye is used singly.

Mr. W. Reed gives the following case, which he calls Monoclepsis, in the first volume of the Lancet for 1831, page 167.

"John Frost, carrier, aged forty-eight, of a stout make, and rather plethoric habit, on his return from Exeter market, was seized with such a dimness of sight, that he could not discern any object at the distance of a few yards, and was unable to keep on the road without holding by the end of his cart, though it was only about three o'clock, P. M., and the day quite fine and clear. Before reaching his home, however, he found that on closing or covering either eye with his hand, he could see sufficiently well with the other. I was sent for to his house next morning, and found that he could scarcely perceive even the lines of a book when both eyes were open, but that on closing either of them, he could read distinctly every word.

"These symptoms were accompanied with considerable pain in the forehead, and a full, quick, and rather hard pulse; being a stout man, I took from the arm about twenty-four ounces of blood, gave him some compound colocynth pills, with a grain of calomel in each; two to be taken every three hours, till the bowels were freely opened, and directed a blister to be applied to the back of the neck at bed-time. Next day I found the pulse softer, the pain of the head gone, but no alteration in the sight, either for the better or worse. In this state he continues, entirely free from pain, but still under the necessity of wearing a bandage over one eye, without

which he cannot even see to walk. Errhines, and a little sp. etheris sulphurici, applied to the eyes twice a day since the application of the blister, always afford him temporary benefit. I cannot discover the slightest irregularity in the motions of the iris; the pupils seem neither more dilated nor contracted than they ought to be; the humours appear perfectly transparent and healthy, and there are no traces of either irritation or inflammation to be perceived. Whether the above anomaly portends the commencement of amaurosis, or is to be considered merely as resulting from a temporary weakness or relaxation of nervous power, I shall leave to the determination of the learned; but I cannot help thinking, that it strongly favours the opinion of those who advocate the existence of some fluid essence circulating in the course of the nerves, the influx of which, in this case, seems insufficient for supporting the action of both eyes at once, but enough when directed upon *one* of these organs, to render vision complete."

The monoblepsis, in this case, was doubtless owing to sudden sensorial congestion, probably with slight strabismus inwards of both eyes, producing double and confused vision; and, in this case, the closure of one eye, by allowing the other to assume, for the time, its normal direction, would amply account for the perfect and single vision which resulted from such a simple measure.

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THE

SANATIVE INFLUENCE

OF

CLIMATE:

WITH AN ACCOUNT OF

THE BEST PLACES OF RESORT FOR INVALIDS

IN ENGLAND, THE SOUTH OF EUROPE, &c.

BY

SIR JAMES CLARK, BART., M. D., F. R. S.

PHYSICIAN IN ORDINARY TO THE QUEEN, AND TO THE PRINCE ALBERT.

FROM THE THIRD LONDON EDITION.

PHILADELPHIA:

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1841.

ADVERTISEMENT

TO

THE THIRD EDITION.

For the present edition, this work has been almost entirely re-written, and whatever appeared not directly to the purpose has been omitted, in order to make room for the consideration of several new subjects, and the introduction of notices of some places not previously described.

In an appendix, a brief account has been given of the climates of our colonies in the southern hemisphere; and, in another short appendix, a few remarks have been made on the application of some of the most efficient mineral waters of the Continent to the alleviation and cure of the principal diseases treated of in this volume. The meteorological tables have received several important additions and amendments.

Since the publication of the last edition, I have continued to receive from numerous medical friends, and others, who had resided some time abroad for their health, the most satisfactory assurances of the accuracy of my descriptions of the different climates, and their influence on disease. My own additional experience has been in perfect accordance with this testimony. Madeira is almost the only place respecting which statements do not quite agree; but after carefully weighing all the information which I have received, I have not found sufficient reason to change my opinion of the climate of that island.

For the valuable new matter which enriches this edition of my work, I am under obligations to various friends, to whom particular acknowledgments are made at the proper places. To the kindness of my friend Dr. Davy, I am indebted for the advantage of perusing his interesting

work, still in manuscript, on the military stations in the Mediterranean. The work unfortunately reached me at too late a period to allow me to avail myself of the information contained in it; but I had the satisfaction to find that Dr. Davy's views regarding the Mediterranean climate are in perfect accordance with my own. Respecting the infrequency of pulmonary diseases among our troops stationed in the Ionian Islands, compared with the other Mediterranean stations, Dr. Davy's experience agrees with the conclusions drawn in the Statistical Reports on the Health of the Army. To Major Tulloch, who has so ably drawn up these reports, I take this occasion to express my obligations for his readiness at all times in supplying me with information on the climates of our different colonies, and the health of our troops stationed there. To my friend, Dr. Martin, of Undercliff, I am also greatly indebted for his assistance in revising and extending the meteorological tables.

J. C.

London, May 1*st*, 1841.

PREFACE

TO

THE FIRST EDITION.

It is nearly nine years since I published a small volume of "Notes" on the Climate and Medical Institutions of France and Italy. This met with a very favourable reception; more, I believe, from the want of such a work, than from any merit it possessed. Since that time I have had ample opportunities of observing the nature of the climate of the South of Europe, and its effects on disease: and during the three years which have elapsed since my return from the Continent, I have endeavoured to make myself acquainted with the milder parts of England, with the view of ascertaining their respective merits, and of comparing them with the climates of the south. The present work may, therefore, be considered as exhibiting the result of much more extended observation and experience than its predecessor.

But although I have endeavoured to take a more comprehensive and philosophical view of my subject, I wish this work still to be regarded as an Essay, which future and yet more extensive observation only can perfect. If, however, it shall be found that I have investigated the subject faithfully and closely, as far as I have gone, and if the results of my researches, and my experience, now recorded, shall prove useful to future inquirers, and serve as a guide to my medical brethren in the application of climate to the prevention and cure of disease, I trust I may be considered as having accomplished all that could be reasonably expected of me, in an inquiry of such extent and difficulty.

The following work is divided into two parts. In the first,[1] I have endeavoured to determine the general physical characters of the milder climates of England, and of the south of Europe—to point out the manner in which the climate of different places

[1] The order of the two parts has, in the present edition, been reversed.

resorted to by invalids is modified by local circumstances; and to compare these places relatively to their influence on disease.

This part is illustrated by a series of meteorological tables (which will be found in the Appendix) more comprehensive and perfect, I believe, than have before been published; and for the construction of which I am indebted to the kindness of my friend Dr. Todd.

In the *second part*, I have given some account of the principal diseases which are benefited by a mild climate. This I found to be unavoidable; it being impossible, otherwise, to give precise directions for the application of particular climates to the cure of particular diseases—and much more so to their varieties and com plications.

In my endeavours to distinguish the characters of some of these diseases in relation to the effects of climate upon them, it may appear that I have been unnecessarily minute; but I have made such distinctions only as my experience warranted; and I have made them, because I feel satisfied that without strict attention to distinctions of this kind, climate can never be successfully applied as a remedial agent.

In treating of two diseases (or rather classes of diseases) I have gone more into detail than the nature of my work may, at first sight, appear to require; but the great importance of these affections, their extreme frequency in this country, and the close relation in which they stand to climate, considered as a remedy, appeared to me to claim for them all the consideration which I have bestowed upon them.

The diseases to which I allude are consumption, and disorders of the digestive organs. Under this last title, I comprehend the various affections designated by the terms "indigestion," "bilious complaints," &c. In the article on consumption, I have endeavoured to show that the disordered states of the stomach are intimately connected with the origin of diseases of the chest, and with tuberculous affections generally. On this account alone disorders of the digestive organs would claim particular notice in a work of this kind; but on their own account they are no less entitled to attention, seeing the amount of suffering and of evil which they produce, and the great benefit which I have shown may be derived from change of air and of climate in the treatment of them.

With respect to the subject of consumption, it will probably be considered the most legitimate of any, in a work treating of the effects of climate. On this occasion, I have directed my inquiries

chiefly to the causes and origin of this fatal disease, with the view of establishing rules for its prevention; being well satisfied that it is only by a knowledge of the causes which lead to it, and by directing our efforts to counteract them, that we shall be able to diminish the ravages of consumption. On this most important inquiry, therefore, I have entered as fully as the nature of my work would admit, and have endeavoured, to the best of my abilities, to fill up the blank which has been left in the natural history of consumption—that, namely, between a state of health, and of established and sensible disease of the lungs.

I feel convinced that by adopting such a system of management, from early infancy, as I have laid down in the following pages, a great improvement might be effected in the general health of many among the higher and middle classes of society in this country. The children of delicate, and even of diseased parents, might, by proper care, be reared so as to overcome, in a large proportion of cases, their hereditary disposition to disease. The ultimate effect of this, in diminishing the vast and increasing extent of hereditary diseases, need not be pointed out.

Instructions respecting the necessary preparation of invalids for a change of climate—for their guidance during the journey, and during their residence abroad, will be found as minutely laid down as the nature of the subject would admit. During my residence on the Continent, I found these matters greatly neglected. They are, however, of the very first consequence to invalids, as without attention to them, the best climate will be productive of little benefit.

It was originally my intention to have added a third part, giving some account of the principal mineral waters of the Continent; but I found, on arranging my materials on this subject, that I could not have condensed them sufficiently for this purpose, without greatly diminishing their value. I have therefore resolved to lay them before the public in a separate volume; and have satisfied myself, on the present occasion, with merely indicating the mineral waters most suitable to the different diseases treated of. This class of remedies will be found to co-operate powerfully with a mild climate in the removal of many chronic disorders.

This is the proper place to notice the kind and liberal assistance which I have received from many friends, while engaged in collecting materials for this work. To Drs. Heineken and Renton of Madeira, Dr. Skirving of Nice, Dr. Peebles of Rome, and Dr. Playfair of Florence, I am indebted for much valuable information.

By the assistance chiefly of the two first named gentlemen, I have been enabled to give more precise information respecting the climate of Madeira, and its influence on disease, than has, I believe, been previously laid before the public. From Dr. Forbes of Chichester, Dr. Lempriere of Newport, and Dr. Down of Southampton, I have received much information respecting several of the English climates. But the gentleman to whom I am indebted above all others, is my esteemed friend, Dr. Todd of Brighton, who has, with one or two exceptions, resided for some time at all the places on the Continent noticed in the following pages, and who has unreservedly communicated to me the result of his observations and extensive experience; so that there is scarcely an article in the work which has not been improved by his suggestions.[1] I also avail myself of the present occasion, with much pleasure, to acknowledge the information which I liberally received from my continental brethren. To my valued friends, Professor De Matthæis of Rome, Dr. Lanza of Naples, Dr. Mojon of Genoa, and Professor Grotanelli of Sienna, I am more particularly indebted in this way. Indeed, the friendly and liberal intercourse which I enjoyed, while on the Continent, with my professional brethren, is one of the circumstances connected with my residence abroad, the retrospect of which affords me the greatest satisfaction. I can assure such of the profession of this country as may visit the Continent, that they will very generally experience there the greatest facility in prosecuting their professional researches; and, I take leave to add, that, if they carry with them minds free from prejudice, and a sufficient degree of practical knowledge to enable them to profit by what they observe, they will not fail to improve themselves.

I hope it will be found that I have succeeded in throwing some light on the obscure subject of the influence of climate on human health, and on the application of it to the treatment of disease. I would also hope, from the minute manner in which I have described the characters of the different climates frequented by inva-

[1] By Dr. Todd's death, which occurred last August, (1840,) the author of this work has lost a much valued friend, and medical science one of its most ardent cultivators. Dr. Todd had long been engaged in a series of researches on some of the most important points of Physiology and Pathology; and the collection of microscopical preparations which he has left, shows what Dr. Todd might have accomplished, had his life been spared a few years longer. The collection has been purchased by the College of Surgeons, to add to the Hunterian Museum.

lids, and the care with which I have indicated the nature of the diseases benefited by them, that I have gone far to correct many of the erroneous opinions which have hitherto existed on these subjects. However this may be, I do at least anticipate this good effect from my labours—that, for the future, those patients only will be sent abroad whose cases afford a reasonable prospect of benefit from such a measure; and, that the practice of hurrying out of their own country a class of invalids, whose sufferings can only be thereby increased, and their lives shortened, will no longer be sanctioned, but that such persons may be allowed, henceforth, to die in peace in the bosom of their own families.

As I anticipated that the following work would be perused by many persons not of the profession, but who are yet deeply interested in the subject of climate, in relation to its effects on disease, I have endeavoured to express myself in as plain language as possible; and I trust I have succeeded in making myself intelligible to the generality of readers, without at all diminishing the utility of my book to the members of my own profession. It has been my wish to lay before the public such a work as might serve at once as a manual to the physician, in selecting a proper climate for his patient, and a guide to the latter while no longer under the direction of his medical adviser. It is only those who have resided abroad, and have mixed much with that numerous class of our countrymen who travel for health, that can know how very much such a publication is wanted; and I may perhaps be permitted to add, at the same time, that it is only those who have attempted to compose such a work that can be aware of the difficulties of the task.

London, May 22, 1829.

THE

INFLUENCE OF CLIMATE,

&c. &c.

INTRODUCTION.

The influence of climate over disease has been long established as a matter of fact, and physicians have, from a very early period, considered change of climate and change of air as remedial agents of great efficacy. This opinion is supported both by reason and experience :—it is reasonable, for example, to believe, that a change of residence from a crowded city to the open country, or from a cold exposed part of the country to a warmer and more sheltered situation—from a confined, humid valley, to a dry elevated district, or the reverse, would produce very sensible effects on the living body ; and we find by daily experience that such is the case. The marked improvement of the general health, effected by the transition from the city to the country, even for a short period, is matter of daily remark; and the suspension, or even cure, of various diseases by a removal from one part of the country to another, is an occurrence that must have come within the observation of every one. It may suffice to mention here, in reference to this fact, intermittent fevers, asthma, catarrhal affections, hooping cough, dyspepsia, and various nervous disorders. These diseases are often benefited, and not unfrequently cured, by simple change of situation, after having long resisted medical treatment; or they are found to yield, under the influence of such a change, to remedies which previously made little or no impression upon them.

If such marked effects result from a change of so limited a nature as has just been noticed, it might be expected that a complete change of climate, together with the circumstances necessarily connected with it, should produce still more important results in the improvement of the general health, and in the alleviation and cure of disease. In this expectation we are also borne out by experience.

Unfortunately, however, for the character of climate as a remedy, it has too often been resorted to, either as a last resource, or it has been misapplied in cases wherein it would otherwise have been

capable of yielding essential service. Patients, who really might have derived much benefit from change of climate, have too often been sent abroad without proper directions regarding the situation most suited to their complaints, and altogether uninstructed respecting various circumstances, a due attention to which is necessary to give full effect to the best selected climate.

Under such circumstances, it need not excite surprise that success has not more generally attended the practice of sending invalids abroad; nor even, that the result should have been such as to bring the remedy into discredit. The fault, however, is to be sought for, not in the remedy, but in the manner in which it has been applied. My own experience has been sufficient to satisfy me, that, for the prevention and cure of a numerous class of chronic diseases, we possess in change of climate, and even in the more limited measure of change of air in the same climate, one of our most efficient remedial agents; and one, too, for which, in many cases, we have no adequate substitute.

On the Continent, the beneficial effects of change of air are duly estimated; and the inhabitants of this country, and more especially of this metropolis, are now becoming fully sensible of its value. The vast increase in the size of our watering places, of late years, and the deserted state of a great part of London during several months, are sufficient proofs, not to mention others, of the increasing conviction that, for the preservation of health, it is necessary to change, from time to time, the relaxing, I may say deteriorating air of a large city, for the more pure and invigorating air of the country. This, indeed, is the best, if not the only cure, for that destructive malady, which may be justly termed *cachexia londinensis*, which preys upon the vitals, and stamps its hues upon the countenance of almost every permanent resident in this great city. When the extent of benefit which may be derived from occasional change of air both to the physical and moral constitution, is duly estimated, no person whose circumstances permit will neglect to avail himself of it.

But to be beneficial, the remedy, simple as it appears, must be employed with judgment and discrimination. In that numerous class of persons, indeed, who are merely suffering from a residence in the city, without any decided disease, the mere change to the country may be all that is requisite to restore their health; it is therefore of less consequence to what part they go. But the case is very different with the invalid whose sufferings are chiefly referable to some particular disease. To him, the selection of his temporary residence is not a matter of indifference. For one individual of this kind, an elevated situation and a dry bracing air, will be most proper; a sheltered residence, with a milder air, will be suitable to another; while the sea-side may be the situation indicated for a third. In like manner it is with the more important measure of change of climate. The valetudinarian whose health is deteriorated by severe study or too close application to business,

and to whom relaxation of mind is as requisite as change of climate, may generally be permitted to choose the situation most agreeable to himself. But the great difference which exists in the physical characters of the climate of the places frequented by invalids in the South of Europe, and even in the southern parts—whether interior or sea-coast—of our own island, renders the selection of a winter residence a matter of vital importance to the invalid suffering under formal disease.

This is a subject which has been but little attended to; and the neglect of it has, I believe, arisen in a great measure, from the opinion which has generally prevailed in this country, that the beneficial effects of climate are evinced chiefly in consumptive diseases. Such an opinion could have originated only in a very limited acquaintance with the influence of climate on disease; and is, indeed, so far from being a correct view of the matter, that, were the character of this remedy to be estimated by its effects on consumption, it would be justly valued at a very low rate. In dyspepsia, and disorders of the digestive organs generally, and in the nervous affections and distressing mental feelings which so often accompany these; in asthma, in bronchial diseases, in scrofula, and in rheumatism, the beneficial effects of climate are far more strongly evinced than they are in consumption. In cases also of general delicacy of constitution and derangement of the system in childhood and in youth, which cannot be strictly classed under any of these diseases; and in that disordered state of the general health which so often occurs at a certain period of more advanced life, *climacteric disease*, in which the powers of the constitution, both mental and bodily, fail, and the system lapses into a state of premature decay, change of climate becomes a valuable remedial agent.

The undue confidence in the powers of climate as a remedy in consumption, which has so long prevailed in this country, is now in danger of giving place to the opposite and equally erroneous extreme of total distrust. This is, chiefly, in consequence of the statistical reports on the health of our troops in almost all quarters of the globe, showing that there is no immunity from this disease in any climate.[1]

It is to be remarked, however, that, when an invalid is sent abroad for his health, he goes, by the direction of his physician, to the climate best suited to his particular case, and at the most favour-

[1] These reports, which have been so admirably drawn up by Mr. Marshall, Deputy Inspector-General of Hospitals, Major Tulloch, and Dr. Balfour, are invaluable, and do infinite credit to the judgment and discrimination of Lord Howick, late Secretary at War, who first duly appreciated their importance to medical science, and to Sir James M'Grigor, who, with the able assistance of Dr. Theodore Gordon, planned the annual reports and topographical statements on which the Statistical Reports are founded. These annual reports, which are highly creditable to the medical officers of the army, were first projected by Sir James M'Grigor, on his being placed at the head of the medical department in 1815, and have been kept up on an uniform plan since 1816.

able season of the year. Moreover, he goes prepared to avail himself of all the advantages of his new situation, and to avoid, as far as possible, its disadvantages. Hence, the influence of any climate upon such an invalid, must be estimated very differently from the influence of the same climate on the permanent inhabitants, or on our troops who are resident in it at all seasons, and are exposed to all its prejudicial influences for years, as well as to many other causes calculated to injure health.

The great lesson which the Army Medical Reports teach, in regard to consumption, is this: that, as it is a prevalent and fatal disease in all climates, and among all nations, our attention should be chiefly directed, not to a state of disease which is incurable by climate or any other means, but to the prevention and cure of the disordered state of health, which constitutes the real cause of consumption. It cannot be too strongly impressed upon the public, that until pulmonary consumption is viewed as a secondary disease, originating in a morbid state of the whole system, we shall make little progress in diminishing the rate of mortality from it, or improving the public health.

I have thought it right to make these remarks to show that I have not overlooked the result of the observations of the army medical officers. They contain much valuable matter on the geography of disease, and on the causes of sickness and mortality among our troops in different climates; and there can be no doubt they will lead to the adoption of measures for preserving and improving the health of the army. But as regards the influence of change of climate in the prevention and even cure of disease, the information contained in these reports does not diminish our hopes of benefit from a temporary change of climate, or even from a more permanent residence, when the climate suited to the individual case is selected, and all other necessary precautions adopted. When change of climate is judiciously employed as a remedy for the constitutional disorder which precedes consumption, there will no longer remain any doubts of its beneficial influence; and what a single change of climate does not effect, a succession of such changes will often be found to accomplish.

Traveling.—The mere act of traveling over a considerable extent of country is itself a remedy of great value, and, when judiciously conducted, will materially assist the beneficial action of climate. A journey may indeed be regarded as a continuous change of climate, as well as of scene; and constitutes a remedy of unequaled power in some of those morbid states of the system in which the mind suffers as well as the body. In chronic irritation and passive congestion of the mucous surfaces of the pulmonary and digestive organs, especially when complicated with a morbidly sensitive state of the nervous system, traveling will often effect more than any other remedy with which we are acquainted.

But neither traveling nor climate, nor their combined influence, will produce much permanent benefit, unless directed with due

regard to the nature of the case, and aided by proper regimen. And here I would comment upon the error of expecting too much from the mere change of climate:—The air, or climate, is often regarded by patients as possessing some specific quality, by virtue of which it directly cures the disease. This erroneous view of the matter not unfrequently proves the bane of the invalid, by leading him, in the fulness of his confidence in climate, to neglect other circumstances, an attention to which may be more essential to his recovery than that in which all his hopes are centred.

A residence in a mild climate will, no doubt, often do much. Among other advantages, for example, it will enable the invalid to be much in the open air during a part of the year when, were he in this country, he would be either confined to the house, or exposed to an atmosphere more likely to increase than mitigate his complaints. The exercise enjoyed in a temperate atmosphere, while it improves the general health, relieves the affected organs, by promoting and maintaining a more free and equable circulation in the surface and extremities; and the constitution thus improved, may be enabled to overcome a disease under which it might have sunk in less favourable circumstances. The new scenes and the objects of interest, with which the South of Europe, more especially Italy, abounds, exert a direct and beneficial influence also on the mental constitution; and this influence will, in many cases, be greatly assisted, in an indirect manner, by the necessary abstraction of the invalid from many causes of care and anxiety—in other words, from many sources of disease, to which he would have been exposed at home.

These are some of the more obvious advantages which the invalid may expect to derive from a residence in a foreign climate; and they are assuredly great: but if he would reap the full measure of good which his new position places within his reach, he must trust more to himself and to his own conduct, than to the simple influence of any climate, however genial: he must adhere strictly to such a mode of living as his case requires; he must avail himself of all the advantages which the climate possesses, and eschew those disadvantages from which no climate or situation is exempt; moreover, he must exercise both resolution and patience in prosecuting all this to a successful issue.

In the body of the work, I shall have many opportunities of pointing out how the various circumstances, connected with change of climate, operate in the renovation of constitutions broken down by the long continuance of chronic diseases. At present I wish rather to impress the mind of the invalid with the danger of trusting too much to climate. Here, as in every other department of the healing art, we must be guided by experience; and must rest satisfied with the amount of power which the remedy concedes to us. The charlatan may boast of a specific for many or for all diseases; the man of science knows that there exists scarcely a single remedy for any disease which can warrant such a boast; and that

it is only by acting on, and through the numerous and complicated functions of the living body, in various ways and by various means, and by carefully adapting our agents to the circumstances of each individual case, that we can check or remove the disorders of the animal system, more especially those which have long existed. Let it not then be imagined that change of climate, however powerful as a remedy, can be considered as at all peculiar in its mode of action, or as justifying, on the part either of the physician or patient, the neglect of those precautions which are requisite to ensure the proper action of other remedies. Had I not considered climate a remedial agent of great value, and deserving the utmost attention of medical men, the present work would not have been undertaken; but I should feel that I were at once compromising the dignity and honour of my profession, and acting in direct opposition to the dictates of experience, if I admitted for a moment, that it is one possessing specific powers, or which may be indiscriminately employed, without regard to the general and fundamental principles of medical science.

The importance which I attach to these considerations, and the conviction that they are not sufficiently attended to in the application of climate as a remedial agent, has induced me to reverse the order of my subject in the present edition, and to notice the diseases benefited by change of climate, before describing the different climates themselves.

PART THE FIRST.

ON DISEASES.

DISORDERS OF THE DIGESTIVE ORGANS.

The prevalence of disorders of the digestive organs and the great influence which they exercise over the other diseases treated of in this volume, claim for them the first consideration. On the present occasion, however, I do not think it necessary to enter so fully into the subject as in the former editions of this work, seeing that it has been more attended to of late years. I shall therefore limit myself to the description of those features of dyspeptic disorder by which the selection of the climate adapted to each of its forms requires to be regulated.

For my present purpose the morbid states of the digestive organs may be classed under three heads:—Inflammatory, or *gastritic dyspepsia;* Irritable, or *nervous dyspepsia;* and *atonic dyspepsia*, or that form of the complaint which depends chiefly on a loss of tone.

Although there are symptoms common to these different forms of dyspepsia, there are others peculiar to each, and by which they are characterised.

In the *gastritic*, or inflammatory species, the tongue is redder than natural, especially towards the apex, where it is beset with small elevated points of a still brighter colour. It is also, for the most part, furred towards the base. In the morning on first awaking, it is dry, more particularly in cases where the irritation extends to the duodenum and liver. The gums are red, swollen, and spongy, and bleed easily; the mucous membrane of the throat is red, often dry and shining, and aphthous ulcers are apt to form on the tongue and inner surface of the mouth. The appetite is good, often craving. There is a disposition to thirst; and pressure over the stomach generally gives uneasiness. The urine is high coloured or turbid; the skin dry and sometimes affected with eruptions, and the extremities, although occasionally cold, are often hot and dry, especially in the night; whilst perspirations are not unfrequent towards morning.

The eyes are injected, and the eyelids red and swollen. The pulse is contracted and quickened, more especially after meals, and

towards night, except in languid constitutions, in which it remains slow. There is frequently a disposition to sleep during the day, and at night the sleep is uncertain; the early part of the night being often passed in watchfulness, whilst in the morning there is a heavy slumber, followed on awaking by oppression and weariness, in place of the refreshment which succeeds to natural rest. Headach is not an uncommon symptom; the pain is generally seated in the forehead, and the sensation is that of tightness and oppression rather than acute pain. It is most common in the evening and during digestion; and that more certainly after an exciting meal. The patient is apt to be irritable, querulous, and despondent; and there is little inclination to mental exertion, or power in concentrating the mind on any subject. The influence of an irritated state of the digestive organs over the mental as well as bodily powers, I may remark in passing, is far greater than is generally believed. In childhood, the irritability of temper with which it is accompanied is very remarkable; when the disorder is protracted, it is also a frequent cause of dulness in children, rendering them incapable of mental application. At a later period of life, the disposition is often so thoroughly changed, the mind rendered so incapable of exertion, and the memory so much impaired by long continued irritation of the digestive organs, that the sufferer becomes unable to apply himself steadily to any thing, and is incapacitated for his usual avocations, or even the ordinary intercourse of social life.

Atonic dyspepsia.—In atonic dyspepsia the symptoms indicate a loss of tone in the digestive organs. There is little or no appetite, often a loathing of food, and even sometimes nausea. After eating there is a sense of distention or of oppression in the stomach, accompanied by a feeling of general uneasiness or listlessness, and a disposition to chilliness; some time after the meal there are eructations, heartburn, and other symptoms of laborious digestion. The tongue is pale and flaccid, not much furred, and seldom or never dry. There is not much thirst except during digestion. The urine is pale and abundant, and the bowels constipated. The pulse is weaker and sometimes slower than natural. The surface and extremities easily become cold; the countenance is pale and the expression dull and heavy; there are inaptitude and inability for bodily exertion, and a corresponding languor of mind.

These symptoms vary in intensity at different times. In bright dry weather, or under circumstances of pleasurable mental emotion, the appetite is better and the digestion is performed without the usual feeling of distress. On the other hand, in damp, cloudy weather, or under feelings of mental depression, all the symptoms are greatly aggravated and others superadded. Epigastric pain, great distention, fetid eructations, vomiting, headach, vertigo, faintness, cold clammy perspirations and cramps are liable to supervene, if much food, or food of an indigestible quality, has been eaten. In such a state of stomach, faintness, amounting to syncope, may

occur after a heavy or indigestible meal, more especially after long fasting.

This form of dyspepsia occurs most frequently in languid leucophlegmatic temperaments, and in cold humid weather and situations.

Nervous dyspepsia.—In nervous or irritable dyspepsia, the tongue deviates less from the natural state; it is pale, and often covered with a thin white fur; in some cases it is swollen, and exhibits the impressions of the teeth along its margins, especially in the morning; it is rarely dry, and there is little thirst. The appetite is unsteady, sometimes craving, and at other times quite wanting, especially for breakfast. Flatulency is a prominent symptom. The urine is pale and often very copious; the bowels, though constipated in some cases, are more frequently in an opposite state, and this is especially the case when the nervous system is peculiarly sensitive.

The sleep is uncertain, easily interrupted, and often unrefreshing. The pulse is small and quick, but less steady in its character than in gastritic or in atonic dyspepsia. The skin is cool, and often damp and clammy. Headach is a prominent and often very distressing symptom in this form of dyspepsia. The morning is the most frequent period of its attack, being felt on awaking; and at all times it is more liable to occur when the stomach is empty than during the process of digestion: hence long fasting proves a frequent exciting cause; over fatigue, articles of food which irritate rather than excite the stomach, such as sweet subacid substances, pastry, dry fruits, and imperfectly masticated food; strong mental impressions, and the air of crowded rooms, are also frequent exciting causes. The headach, when occurring during the day, is sometimes sudden, but in the severer attacks is generally preceded by a sense of coldness and creeping on the surface, which may amount to shivering. In some cases the attack is preceded by numbness in the extremities, by dimness of sight, or ocular spectra; in others, a peculiar uneasy sensation, originating in one of the extremities, ascends gradually to the head, resembling the aura epileptica. Nausea or vomiting occasionally occurs at this stage, and the pulse is mostly slower than natural. In the commencement, there is a sensation of uneasiness rather than of actual pain; but as the feeling of coldness diminishes, the true headach becomes developed. The pain is then intense and throbbing, affecting one side in general more than the other; and in the cases in which it has been of the most agonising kind has been confined to a small spot over one eyebrow or temple. The upper and back part of the head is often the seat of pain, and the latter place is particularly apt to be so, when the headach is partly dependent on uterine irritation or congestion. The pain, wherever seated, is greatly aggravated by mental excitement or bodily exertion. This class of headachs is common, in delicate nervous persons, particularly females, when its immediate dependence on dyspepsia is often

overlooked, but very generally the connection is discovered upon minute inquiry into the circumstances of the case.

The temper is apt to be fretful, and the mind anxious and desponding, particularly regarding the health.

Independently of the particular symptoms belonging to each form of dyspepsia, there are circumstances in their general character which distinguish them. The symptoms which accompany gastritic dyspepsia, are more fixed and permanent; they may be present in a greater or less degree, according to circumstances, but they are scarcely ever absent. In nervous dyspepsia, on the contrary, the symptoms vary in a remarkable manner. The patient feels, at times, almost entirely free from them, and the functions of the digestive organs are performed with scarcely any indication of derangement; at other times all the symptoms are greatly augmented, the patient being unable to assign any cause for their disappearance, in the one case, or their increase in the other. Atonic dyspepsia resembles more in its characters the nervous dyspepsia with which it is often complicated. Both forms are greatly influenced by mental emotions, changes of the weather, and other causes which particularly affect the nervous system. The symptoms which characterise the gastritic form of the disease, are increased by stimulants of every kind taken into the stomach, whereas the same means often afford temporary relief in the other two forms.

In mixed cases, these distinguishing characters may be observed more or less as the one or other form of dyspepsia prevails. When the gastritic and nervous dyspepsia exist together we have both inflammatory excitement and extreme morbid sensibility—the one or other state predominating at different times. This form of the disease occurs chiefly in persons of a nervous temperament, to whom the causes of gastritic dyspepsia have been applied. In like manner, nervous is often associated with atonic dyspepsia;—a morbidly sensitive state of the stomach with loss of tone, a condition the converse of inflammation. Yet, in all these mixed cases, the distinctive characters of the prevailing affection may generally be recognised.

But in protracted cases the disorder is seldom confined to the stomach; it is gradually propagated to other portions of the digestive tube, and the secreting organs in connection with it; more especially to the duodenum and liver. In many cases, indeed, the disease is chiefly seated in the duodenum, constituting what has been denominated *duodenal dyspepsia*, a very important form of dyspeptic complaint, to which I shall have occasion to recur, when noticing the diseases of children, under the head of *strumous* or *scrofulous dyspepsia*, or that form which is most frequently observed in children of a scrofulous constitution.

We also find that the morbid state of the digestive organs, in place of being propagated along the mucous surfaces, extends its influence to other systems. Thus we find it giving rise to various

affections of the skin, of the joints, and of the nervous system. Among the last may be mentioned, in addition to headachs, convulsive affections, tic douloureux, paralysis, amaurosis, deafness, loss of smell, loss of voice, spasmodic cough, asthma, palpitation, &c.

The nature of the secondary affection depends, often, upon peculiarities of constitution; but frequently, also, upon accidental causes, exciting or disposing to particular diseases during the existence of dyspepsia. The new disease being engrafted on the old, becomes as it were dependent on it, and the former cannot be cured till the latter is removed. The secondary disease being established, the primary affection is often mitigated, at least for a time. Indeed, so remarkably is this the case, that the primary disease is frequently overlooked, both by the patient and his medical attendant, amid the more prominent symptoms of the secondary affection. This I found frequently the case in patients sent abroad labouring under chronic bronchial and tracheal irritation, symptomatic of gastritic and duodenal dyspepsia.

Among the remedial measures for these various morbid conditions of the digestive organs, and the sympathetic diseases which originate in them, change of climate is one of the most efficient. Even when the patient cannot avail himself of a more complete change of climate, he may still derive much benefit from a temporary residence in some of the milder situations in our own island.

In recommending such a change, however, to the dyspeptic invalid, the peculiar disorder of the stomach must be attended to. The different forms of the disease, noticed above, require different climates. The patient with gastritic dyspepsia should not, for example, go to Nice, nor the southeast of France. In cases of this kind, the southwest of France or Devonshire are preferable, and Rome and Pisa are the best places in Italy. On the other hand, in atonic dyspepsia, in which languor and sluggishness of the system, as well as of the digestive organs, prevail, with lowness of spirits and hypochondriasis, Nice is to be preferred to all the other places mentioned; and Naples will generally agree better than Rome or Pisa; while the southwest of France and Devonshire, and all similar climates, would be injurious. In the nervous form of dyspepsia a climate of a medium character is the best, and the choice should be regulated according as there is a disposition to the gastritic or the atonic form.

In the more complicated and protracted cases, still more discrimination is required in selecting the best climate and residence; as we must take into consideration not merely the character of the primary disorder, and the state of mind with which it is associated, but the nature of the secondary affection which may already exist, or to which the patient may be predisposed.

To insure the full advantages to be derived from the best selected climate, urgent symptoms should be removed or alleviated before the patient commences his journey; and he should, moreover, have the nature of his disorder, and the principles upon which

he should regulate himself while traveling, and during his residence abroad, fully explained to him. Indeed, the want of attention to these things is one of the chief reasons why so many dyspeptic invalids derive little permanent advantage from their summer tour, or even from a more prolonged residence abroad. In order to secure success from change of air or climate, it is necessary that the patient should understand the conditions on which the promise of advantage is made, and how they are to be best and most perfectly fulfilled. Above all, it should be impressed on his mind, that he is not to expect too much from climate; that he must sedulously avoid the causes which brought on the disease, and adhere with steadiness to such a general regimen as is necessary for its removal. Aided by this moral and medical discipline, a winter spent in a favourable climate cannot fail to prove highly beneficial to the dyspeptic invalid; and a well directed course of mineral waters, the following summer, will, in many cases, be of the greatest service in restoring the impeded functions of the abdominal viscera and of the skin. After this, the patient may enjoy a degree of bodily health, and of mental energy, to which he has long been a stranger; and may continue to reap the fruits of his perseverance and self-denial, so long as he shall avoid the exciting causes of the disease.

The extent to which change of air or climate requires to be carried, for the removal of stomach complaints, will depend on the circumstances of the case. In many instances a few months, even a few weeks, judiciously employed, will do much for the restoration of the health; in others, a much longer period will be required. In treating, therefore, of the influence of change of climate and change of air in dyspeptic disorders, it will be both convenient and useful to divide them into two classes—the more recent and simple, and the more protracted and complicated cases.

Of the more recent and simple cases of Dyspepsia.—Under this class of dyspeptic patients is comprehended that numerous body of our citizens, and the inhabitants of large towns generally, whose health, and digestive organs in particular, have suffered by a sedentary life, close application to business, errors in regimen, &c. during the winter, and who require change of air during the summer.

The plans generally adopted with this view, are a visit to some of our watering places, or a tour through the mountainous parts of our own island, or on the Continent,—and more particularly in Switzerland. The preference which one or the other of these measures may deserve, will depend upon the nature of the case, the convenience of the patient, and various other circumstances, which can be appreciated only by the patient himself, and his physician.

We shall suppose that a tour is the measure adopted. Having had the more urgent symptoms of his complaint removed or alleviated, before he sets out,[1] the next object of importance with the

[1] See Introductory Remarks to PART SECOND.

dyspeptic traveller is diet. This must be regulated according to the state of the digestive organs, regard being had to the exciting effects of traveling, which render more especial attention to the diet necessary during a journey. If much gastric irritation exists, and, more especially, if this is accompanied with any disposition to fever, the diet should be very mild and moderate in quantity. A small proportion of animal food, once a-day, is all that should be allowed in such cases. Tea or arrow-root, or sago, forms the best evening meal. The best general drink is toast-water; wine, and all kinds of fermented liquors and spirits, should be avoided by the greater number of dyspeptic patients during a journey.

I am aware that in traveling on the Continent, it is not always an easy matter to obtain that kind of food which is suitable to irritable or delicate stomachs; but a little management on the part of the traveller will generally suffice to obviate this difficulty. The soups of the Continent, if not so strong, are generally more wholesome, and agree better with irritable stomachs than the rich exciting soups used in this country. The opinions commonly entertained respecting soup in dyspeptic affections, are not applicable to every form of dyspepsia, nor to all soups.

Fruit should generally be abstained from, as it will seldom be found to agree in any form of stomach complaint. An exception is to be made in favour of good ripe grapes, which are often useful in gastritic dyspepsia. Ripe grapes, eaten in considerable quantity for several weeks together, is a remedy (*cure de raisins*,) employed on the Continent in several complaints. In the inflammatory form of dyspepsia, more especially when there exists a similar state of the mucous membrane of the intestines, with a disposition to diarrhœa; also in chronic cases of this disease, and in hemorrhoidal affections, ripe grapes are considered of great use.

If the dyspeptic invalid will observe the effects which the different articles of food produce, and be true to himself and candid in his observations, he will soon discover that the more moderately he lives the better he will feel. When he has passed a restless night, or has a dry or loaded tongue, or bitter taste in the morning, he may be assured, that the regimen of the preceding day was not suited to him, that he has erred either in the quantity or quality of his food, and should regulate himself accordingly for the future.

The next circumstance requiring the particular attention of the dyspeptic traveller, is the state of the bowels. Constipation is an evil from which travellers generally, and more especially dyspeptics, suffer; and it is of great consequence that this state should be obviated. The mild diet which has been recommended will be a means of favouring the action of the bowels, and of moderating the injurious effects of their inaction when this occurs. For the removal of constipation, the milder laxatives are much safer, and more effectual than drastic purgatives. The latter, even when given in the smallest doses, irritate the stomach and bowels, and, in this way, are often productive of more mischief than the state they are in-

tended to obviate, which state their frequent repetition tends, moreover, to confirm. Castor oil, or confection of senna, or manna, taken in such doses only as are sufficient to obviate constipation, are the best medicines. They may be taken at bed-time, so as to act the following morning. When the stomach cannot bear these medicines, a mild aperient pill may be occasionally given. But what often answers much better than any aperient medicine, is the use of mild *lavements*. To persons who have very sensitive bowels, and who suffer from constipation, this proves an invaluable remedy, more especially during a journey; and no one should travel without being provided with the means of relieving the bowels in this way. The relief obtained by the judicious use of this remedy, will not only add greatly to the comfort of the patient, but favour the return of the bowels to a more healthy and regular performance of their functions; while it will obviate the necessity of having frequent recourse to purgative medicines, a fruitful source of mischief, as I have already remarked, to dyspeptic invalids. The lavements should consist of water, barley-water, oatmeal-water, or thin gruel, tepid, or, what answers better in many cases, an infusion of chamomile flowers. Cold water proves very beneficial in some cases; but soap and more irritating substances are generally objectionable. The quantity injected need not be great; half a pint, or even less, will often bring on an action of the bowels more readily than a larger quantity.

Tepid bathing is a remedy that should never be neglected by the dyspeptic invalid while traveling. Independently of its utility as a means of cleanliness and comfort, it promotes the cutaneous exhalation, tends to equalise the circulation, and cools and soothes the whole system.

If the dyspeptic invalid will attend to these simple directions, he may derive much and lasting benefit from his tour. He should keep in mind that he has an important object in view; that health is only to be regained by such a mode of traveling as is compatible with his strength, and by strict adherence to such a regimen as comports with the deranged state of his digestive organs.

These observations, which are intended chiefly for travellers on the Continent, are equally applicable to those who confine themselves to excursions in our own island, or passing some time at the sea-side, or inland watering-places, during the summer. Those who visit the sea-coast will find the tepid sea-bath a most valuable remedy. With a few dyspeptics cold sea-bathing may agree, but does not suit the majority of cases. The cold or tepid shower-bath is better, and will be found more generally beneficial. The warm or tepid bath is useful in almost every case. The vapour bath will prove serviceable in certain cases, more especially where the skin has been long in a dry state; but its indiscriminate use for the removal of this symptom, is calculated to do mischief. It should be impressed on the patient's mind, that it is in vain to expect that any kind of bath, or any remedy, will restore the natural secretion of

the skin, while the irritation of the digestive organs is kept up by improper diet. The dry skin is consequent upon irritation of some internal organ; and until this be removed the natural state of the surface cannot be restored. Without attention to this, the vapour bath will be of little use, and may prove injurious.

The great and common errors in dyspeptic cases are, as I have already said, the condition in which invalids are sent abroad, and the manner in which they live while there. Much greater and more permanent benefit would be derived from a change of air, were its effects aided by such remedial measures and such a regimen as the nature of the case requires. As these matters are generally managed, the invalid has frequently not returned many weeks, when he finds himself in the same state nearly as when he left his home. The reason of this is sufficiently obvious. Previously to the tour, nothing effectual is done for the mitigation of the disorder of the digestive organs, and no system of regimen is adopted, by which the beneficial effects of change of air and traveling may be favoured and rendered more permanent. All is trusted to air, relaxation from business, and amusement; and when the influence of these is withdrawn, the dyspeptic and nervous invalid lapses rapidly into his former state.

Of the more protracted and complicated cases of Dyspepsia.—Persons whose digestive organs have been long deranged, and whose constitutions have suffered in consequence, will require, in order to obtain much or lasting benefit, a more prolonged residence in a mild climate. The impressions produced by causes operating for a series of years on the digestive organs, and, through them, on other important organs, and on the system generally, are not to be effaced by a residence of a few months in the best climate, even when assisted by the most judicious regimen, and the most exemplary conduct on the part of the patient.

Generally speaking, such invalids will derive benefit by changing our damp, chilly climate, for a drier and milder one, during the winter. But it is not a matter of indifference in what place they fix their abode; and, indeed, it was chiefly the consideration of this circumstance which induced me to go somewhat into detail, in endeavouring to describe the distinguishing characters of the different affections of the digestive organs.

I have pointed out three forms of dyspeptic disorders:—one, in which there is an inflammatory state of the mucous surfaces of the digestive canal; another, in which an opposite condition prevails—a state of atony; and a third, in which a morbidly sensitive state of these organs is the principal feature, and which is also, for the most part accompanied with a languid condition of the digestive function. These are important distinctions, and must never be lost sight of in prescribing for dyspeptic patients, whether it be regimen or climate.

It is true that these morbid states pass into each other in every variety of shade, from the pure inflammatory dyspepsia on the one hand to the pure atonic dyspepsia on the other; and the successful

management of each case will much depend upon the degree of discrimination exercised in referring it to its proper place in the scale. This applies as much to change of climate, as to any other remedy.

The selection of a residence even in the same place is not a matter of indifference to very sensitive invalids. One will feel himself better in an elevated situation, another in a lower and more sheltered one. The high and low and more confined situations of Rome and of Naples, afforded me many opportunities of observing the different effects of locality on such persons, and satisfied me of the necessity of attending to this circumstance, in selecting a residence for them. But dyspeptic patients, who pass the winter in Italy, need not in general be limited to one place. Although the climate most suited to the particular character of their complaint should be selected as their head-quarters, they may visit, during the season, the principal cities in the south of Italy; and if this is done with judgment, the successive changes may prove beneficial to their health. Generally speaking, Rome will be the best residence in Italy in gastritic dyspepsia, especially during the spring; Nice the best climate in the purer cases of atonic dyspepsia.

To all these patients the spring proves the period of the greatest excitement; and they who are disposed to the more acute kind of stomach affections, must be particularly on their guard against whatever excites the digestive organs at this season. The same degree of stimulus that is tolerated in the winter, will prove injurious to them in the spring. In irritation of the mucous membranes, whether of the digestive or pulmonary organs, I had every year occasion to remark the increase of excitement that occurred during the spring months in Italy. At this season there are great and often rapid alternations of temperature, which are extremely exciting to sensitive invalids. A powerful sun, frequently accompanied with a sharp wind during the day, alternates with cold nights. This may be said to be the character of the spring every where; even within the tropics it prevails in some degree; but in the south of Europe it is particularly so, and this circumstance renders the climate injurious in the more acute degrees of gastritic dyspepsia.

It is not, however, as I have already observed, for the acute forms of dyspepsia that I recommend a change of climate—but for affections of some standing, in which the more acute stage has passed over, and with it the highly excitable state of the digestive organs. For these, and for the essentially chronic cases of dyspepsia, a residence for some time in the south of Europe, under the limitations already pointed out with respect to season, residence, regimen, &c., will be of the greatest service. For the hypochondriac, more especially, whose mind is likely to feel an interest in the variety of scenes, and the objects of art which present themselves so abundantly in Italy, I know not any measure more likely to prove beneficial. I class the hypochondriacal with the dyspeptic patients; because, without venturing to affirm that hypochondriasis

is always a consequence of dyspepsia, I think it may be safely asserted that the former is very rarely met with unaccompanied by more or less of the latter; and, in a large proportion of cases, both acknowledge the same origin, and are cured by the same means.

Though patients of a hypochondriacal turn of mind should not be encouraged to dwell on their complaints, and attend to every trifling sensation, I consider it essentially wrong to send them abroad with the assurance that their complaints are purely imaginary,—that nothing is required but change of air, of scene, and amusement, to dispel their gloomy thoughts and restore their health. That there may be cases in which the physician can do little more for his patient than commit him thus to the wide world, I am not prepared to deny; but I believe they are rare; at least I did not meet with any such during a residence of many years on the Continent, where my intercourse with patients of this class was pretty extensive. On the contrary, a single case did not fall under my observation, in which careful examination could not detect a deranged state in the functions, if not in the structure of some internal organ; and in which judicious medical treatment would not have promoted the beneficial influence of climate. When we are better acquainted with the morbid conditions of the digestive organs, and with the extensive influence which they exert on the mind, we shall have less frequent occasion to confess our ignorance of the patient's complaints, by attributing them to nervousness, to low spirits, or other imaginary states designated by the like unmeaning expressions.

With regard to the general management of these cases while the patient is traveling,—the same directions are applicable as to the more recent cases of dyspepsia, which have just been detailed.

As on the journey, so during their residence abroad, the diet is the most important circumstance requiring the attention of dyspeptic invalids. Seeing that the stomach is the organ primarily and principally affected, it requires no argument to prove that, unless the diet be such as is suited to its morbid condition, climate, or any other means, will do little good. It is impossible, however, in this place, to do more than point out in a general way the kind of diet which I found most generally suited to this class of patients. I have already remarked, and it is a circumstance deserving the particular attention of invalids, that, in removing to a warmer climate, the sensibility of the system is increased, and that consequently stimulants of every description more easily excite. Hence, the diet which may be proper in England, will not agree in Italy, nor in the south of France. This remark is especially applicable to persons suffering from stomach complaints. There is, no doubt, a difference in dyspeptic patients, as well as others, in this respect; but I invariably found a mild and very moderate diet the most suitable for them; and for this plain reason,—that whatever may be the nature of the disorder of the stomach, debility, or, in other

words, a diminution in the powers of the organ for the performance of its functions, is an almost constant accompaniment of the disease.

Wine, when it is permitted, should always be taken in great moderation; and it will be found that the lighter kinds, if not acid, generally agree the best. Of wines imported into Italy, those of Bourdeaux are to be preferred. The spirituous wines of Spain, Portugal, and Sicily, if used, should be largely diluted. Seltzer water will often prove a good substitute for wine.

It would be a wise rule for all dyspeptic patients to abstain entirely from every thing that is brought to table in the form of dessert. This advice I feel cannot be urged too strongly; nor can the dyspeptic patient have too forcibly impressed upon his mind that temperance and abstemiousness are the best physic. The belief so generally entertained that medicine can counteract the effects of habitual errors in regimen, should be regarded as mere sophistry. There is but one road to a permanent cure in these cases, and he who shall steadily pursue it long enough to feel its advantages, in the restoration of mental and bodily energy, will not easily be induced to deviate from it again.

Exercise in the open air is one of the greatest advantages which a winter residence in the South affords; and the dyspeptic invalid should take full advantage of it. Walking and riding on horseback are the best kinds of exercise, but neither should be carried so far as to produce over-fatigue. When the irritation of the stomach is complicated with that of the bronchial membrane, riding should be chiefly relied on for exercise. Exercising the arms every morning is very useful in dyspeptic complaints; for this purpose the clubs so much used in India are much to be preferred to dumb-bells. While on the subject of exercise, I must not omit to mention that on the water, which to many invalids is very soothing and beneficial.

Friction of the whole surface of the body, night and morning, is a valuable remedy, and is especially suited to the sedentary, as being the best substitute for exercise. For those whose occupation compels them to a sedentary life, in our damp and cold climate, there are few remedies more useful, though none more neglected, than friction. The diligent use of this, and sponging the surface with cold or tepid vinegar and water, or the shower-bath daily, during summer, and the use of the warm bath at all seasons, regulated according to the constitution of the patient, form a powerful combination of means for maintaining the health of such persons as are constrained by circumstances to forego the natural modes of bodily exercise in the open air; and the same measures are often singularly efficacious in restoring the diminished energy of the skin and digestive organs in cases of nervous and atonic dyspepsia. They should not, however, be considered as superseding exercise in the open air when at all practicable. For the want of exercise, nothing can fully compensate; but the means which I have sug-

gested will in some degree supply its place, and will always prove beneficial to the class of invalids for whom I am now writing.[1]

Cold and damp weather is particularly injurious in dyspepsia, more especially in the nervous and atonic forms, in which coldness of the surface and extremities, is a prominent symptom. The use of warm clothing, therefore, forms an essential part of the treatment in such cases. Flannel should be worn next the skin during the day; and when any change of dress is made in the summer, it should be effected gradually and with great caution; and the change of weather in autumn should always be anticipated by a return to warmer clothing. These precautions are equally necessary in a southern climate.

All these measures tend directly to maintain a free circulation through the extremities and surface,—an object of the greatest importance in the treatment of dyspepsia. Indeed, I conceive that it is chiefly in consequence of the active circulation on the surface during the warmth of summer, and being more in the pure open air, that so many feeble, dyspeptic, and nervous invalids find themselves better and get stouter during that season, and that the hypochondriac's mind is freed of half the gloom which oppressed it; whilst, on the contrary, it is from the diminished activity of the circulation in the surface and extremities, and the consequent congestion of the internal organs, and also from breathing so constantly the comparatively impure air of a room, that such patients languish during nine months of the year in this country. On this principle, much of the advantage derived from passing the winter in a mild climate may be explained.

If the measures which I have just recommended be steadily adopted, little medicine will be required. It will at all times be necessary to attend to the state of the bowels; though the dyspeptic invalid should endeavour to bring them to act regularly by proper regimen and exercise rather than by medicine. That this may generally be done, even in very obstinate cases of constipation, I am satisfied from experience; and in young persons regularity of bowels may often be induced, in a much shorter period than could be believed. In this respect a change of climate often acts very beneficially.

I once more beg that it may be clearly understood that I do not recommend traveling, or a residence in the south of Europe, to patients labouring under the more acute forms of gastritic dyspepsia; much less do I advise such a measure to those labouring under organic disease or chronic inflammation of any of the abdominal viscera. When organic changes have taken place, or inflammation is established in any organ of importance to life, a long

[1] For the most judicious instructions on this subject, the reader is referred to Dr. Combe's work on the *Principles of Physiology applied to the Preservation of Health, and to the Improvement of Physical and Mental Education*, Eighth Edition;—a book which no family should be without.

journey is more likely to increase than diminish the evil. Whenever inflammation exists in a degree sufficient to excite the circulation, in whatever organ or structure it may be situated, I consider rest an essential part of the treatment, although it is much neglected in chronic diseases.

The nature of a disease should be well ascertained before the patient is urged to take active exercise, or is permitted to undertake a long journey. If the disease be of a purely nervous character, active exercise in the open air forms a most effectual means of restoring the health; whereas, if the symptoms depend on chronic inflammation, the same measure will scarcely fail to increase it, and, as I have frequently had occasion to observe, may even convert a chronic into an acute disease. The distinction is, therefore, very important, but it is one which I have reason to know is not generally attended to.

After a winter passed in a mild climate, a judicious course of mineral waters will prove a very efficient remedy in cases of dyspeptic disease, dependent upon, or complicated with a congested state of the liver and other abdominal organs, and a disordered state of all the secretions. For my views on this subject, I must refer to the Appendix on Mineral Waters.

PULMONARY CONSUMPTION.

There is no subject connected with health, possessing greater claims to attention than that which relates to the class of diseases of which Pulmonary Consumption is one of the most frequent and fatal forms; at the same time, there is perhaps none concerning which the public is less accurately informed.

In the former editions of this work, I entered pretty fully into the causes, nature, and progress of Pulmonary Consumption; but having lately published a separate Treatise on the subject, I shall confine myself, on the present occasion, to a brief description of the constitutional disorder, Tuberculous Cachexy, which precedes consumption, and to a notice of the more evident indications by which a tuberculous state of the lungs may be recognised.

Tuberculous Cachexy was employed, in the first edition of this work, to designate that morbid state of health which precedes, and in fact, constitutes the essential predisposing cause of pulmonary consumption. The term has been generally adopted by the profession, but the disorder itself has not yet received that degree of consideration which its importance demands. The attention is still too exclusively directed to the pulmonary disease, and too little notice taken of the constitutional affection; although it is only on the proper treatment of the latter that we can rest our hopes of success,—all efforts to cure the former having been as yet comparatively of little avail. It is of the utmost consequence, therefore,

that we should be able to distinguish the leading features by which the constitutional, or curable period of the disorder may be recognised.

The aspect and general appearance of a young person labouring under tuberculous cachexy, are generally well marked. The countenance is pale, with a sallow cast, although it is in this respect subject to considerable variations. In persons naturally of a florid complexion the changes are often very remarkable: at one time general paleness, with a faded expression of countenance; at another, an irregular mixture of white and red prevails; but in place of the gradations by which these colours pass into each other in health, they terminate abruptly, giving the face a blotched or spotted appearance. Sallow complexions assume a peculiarly dull, leaden hue; there is paleness or lividity of the lips; the eyes have generally a dull, pearly aspect; and the whole countenance commonly appears sunk and languid. These indications, as I have already said, are very variable, and may pass for many months unnoticed, except by the immediate relations or the physician; but as the constitutional disorder increases they become evident to the most cursory observer.

Upon close examination, the skin of such a patient will be found in an unhealthy condition: either harsh and dry, or moist, clammy, and relaxed. Its colour, too, is often changed to a sallow, and, in some cases, to a dirty yellowish hue; and, except on the cheeks, there is always a deficiency of red vessels. In some hereditary cases, particularly in females of a fair and delicate complexion, the skin has a semi-transparent appearance, resembling wax-work, and the veins may be seen distinctly through it. The temperature, also, of the surface and extremities is below the standard of health.

The digestive organs are very generally deranged, though the degree and nature of the derangement differ materially in different cases. The tongue is more or less furred; the point and margin are redder than natural, and often studded with enlarged fungiform papillæ of a still brighter hue. In a class of cases, of much rarer occurrence, the tongue is clean and natural in its appearance, and the mucous membrane of the internal fauces pale. I have remarked this chiefly in females, in whom the disease has been owing to hereditary predisposition, and little complicated with gastric disorder. But in by far the greater proportion of cases, the functions of the digestive organs are more or less deranged.

The nervous system also partakes of the general disorder. There is more nervous sensibility than is natural to the patient. The sleep is not sound; being disturbed or unnaturally heavy, and rarely refreshing. In the purer and less complicated cases of hereditary consumption, there is generally great serenity of mind; the spirits are of surprising buoyancy; and the hope of recovery remains to the last. But this state of mind is a less constant attendant on consumption than is generally believed; especially when it has been preceded by long continued disorder of the digestive

organs. In such cases there is oftentimes great impatience, and irritability of temper.

The state of the circulation is subject to great variety. In hereditary cases, the power of the heart is commonly under the ordinary standard, whilst the frequency of the pulse is generally above it, and palpitation is a frequent symptom. The circulation is in general feebly carried on through the extreme vessels, as is shown by the condition of the skin already noticed, and the tendency to coldness of the extremities. This state of the surface and extremities is a very constant attendant on abdominal congestion, complicated with an irritated condition of the gastro-intestinal mucous surfaces; and hence it is generally more evident, according as the disorder of the digestive organs is more considerable.

Although, in the great majority of cases, the indications of disease just enumerated are sufficiently apparent during a considerable period before the occurrence of pulmonary disease, cases do occasionally occur, and the subjects are chiefly delicate young females, where tuberculous disease is indicated by such faint signs, and steals on so imperceptibly, that the patient may be on the brink of the grave, before the friends are aware of the existence of danger; but this is rare, and will be still more so, when the symptoms which indicate the approach of this insidious disease are more generally known and attended to.

Tuberculous cachexy is sometimes complicated with chlorosis, and in such cases the latter is often considered the primary disease, the error not being discovered till those means so successfully, in general, employed to combat it, are found to produce a very temporary benefit only.[1]

The disordered state of health which I have just described may manifest itself in the child at birth, or it may be induced at any period of life by the exciting causes to be presently noticed; although the operation of these is more rapid before the body has acquired its full maturity, than at a later period of life.

Hereditary Origin.—A patient labouring under tuberculous cachexy, entails on his offspring a constitutional predisposition to consumption. But it is a grievous, although a very common error, to suppose that this predisposition is derived from consumptive and scrofulous parents only. The offspring of persons labouring under a deranged state of health, it matters not from what cause, are very generally predisposed to tuberculous diseases. When this truth is generally recognised and acted on, a greatly improved state of the public health will be the consequence.

From whatever causes the hereditary predisposition may have originated, the earlier in life the means of correcting it are adopted the more successful will they be. Our efforts to improve the health should commence with the birth of the infant, and be continued

[1] In Dr. Ashwell's Practical Treatise on the Diseases Peculiar to Women, will be found some judicious remarks on this state of disease.

till it has reached maturity. But the errors committed in the nursery, and too often continued during childhood and youth, rather tend to confirm and augment the hereditary delicacy; and such will be the case till parents are taught to entertain more correct views respecting the means of promoting the health of their offspring.[1]

Exciting Causes.—Whatever deteriorates the health may lead to tuberculous cachexy; residence in a low, damp, and chilly atmosphere; long confinement to close, ill ventilated rooms, whether nurseries, school-rooms, or manufactories; deficient exercise in the open air; improper food, either deficient in quantity or of innutritious quality; or the habitual use of an overstimulating diet. In short, imperfect digestion and assimilation may induce tuberculous cachexy; and the earlier in life these causes are applied the more rapidly in general will their effects be manifested. The offspring of the healthiest parents may thus become tuberculous in early life, if long exposed to the exciting causes enumerated.

I shall now endeavour to state, with as much precision as the nature of the subject admits, what may reasonably be expected from change of climate in tuberculous cachexy, and in consumption at the different stages of its progress, and under its different complications.

For the removal of the deranged state of the health, which has been shown to precede consumption, a change to a milder climate is a very powerful remedy, when aided by such other means as the peculiar circumstances of the case may require. Before making such a change, however, the functions more evidently deranged should, as far as possible, be restored to a healthy state.

In a large proportion of cases, the functions of the digestive organs and skin, as I have already remarked, are deranged, and, until they are improved, we shall make little progress in remedying the constitutional disorder, even under the influence of the best climate. But the means employed for effecting this should be directed with judgment and moderation. It must be recollected that we have to deal with a constitution either hereditarily weak, or which has been brought into its present condition by a long series of morbid actions, and cannot be at once forced back into a healthy state. Even when inflammation exists, we must keep in mind that it is inflammation in a disordered habit, and apply our remedies accordingly. For if the strength is now broken up, and the balance of the circulation suddenly disturbed by debilitating remedies, the system may lapse rapidly into tuberculous cachexy. On the other hand, stimulating or irritating remedies will be equally pernicious. In the cases now under consideration, local congestion

[1] Dr. Combe's recent work on the Physiological and Moral Management of Infancy, will effect a vast improvement in nursery management, and in the health of children. It is the most valuable work on the subject of health which has ever been published, and no parent capable of reading his own language should be without it.

and irritation often exist with general debility; and it requires more judgment to manage this pathological state, than almost any other with which I am acquainted. The principal object, in such cases, is to promote a more free and regular distribution of the circulating fluids through the parts in which they have been deficient, and to relieve those parts or organs which have been overloaded. This will be best done by a mild, nutritious diet, suited to the state of the digestive organs; by exercise in the open air, especially on horseback, proportioned to the strength of the patient; by the use of the warm bath; by cold sponging, and friction of the surface, especially on the chest and extremities. In short, the whole system being deranged, we must not content ourselves by directing attention to one or two disordered functions; but, by operating on all, endeavour to raise the standard of health generally.

The removal of gastric or bronchial irritation, when it exists, and the regulation of the bowels, are the circumstances which chiefly require the employment of medicines. The proper application of these in each individual case, must depend on the judgment of the medical attendant.

The deranged functions having been corrected, and the general health improved as much as the circumstances of the case admit, the patient may change his climate with well grounded prospects of permanent advantage.

Unfortunately, it too often happens, that the period of constitutional disorder, which we have just been considering, is permitted to pass; and it is not until symptoms of irritation or impeded function in the lungs, such as cough, difficult breathing, or spitting of blood, appear, that the patient or relations are alarmed, and that fears are expressed that the chest is "threatened." Such symptoms are but too sure indications that tuberculous disease has already commenced in the lungs. It may, indeed, be difficult, in some cases, to ascertain the positive existence of this, although by a careful examination of the chest, and an attentive consideration of all the circumstances of the case, we shall seldom err in our diagnosis; and it need not, at any rate, affect our practice; as a strong suspicion of the presence of tubercles should lead us to adopt the same precautions, as the certainty of their existence.

When tuberculous matter is deposited in the lungs, the circumstances of the patient are materially changed. We have the same functional disorders which existed in the former state: and we have also pulmonary disease, predisposing to a new series of morbid actions—to bronchial affections, hæmoptysis, inflammation of the pleura, and lungs, &c., which calls for important modifications in the plan of treatment. Removal to a mild climate, especially if effected by means of a sea-voyage under favourable circumstances, may still be useful, on the same principle as in the former case—namely, as a means of improving the general health, of preventing inflammatory affections of the lungs, and even perhaps arresting the progress of the disease.

When consumption is fully established—that is, when there is extensive tuberculous disease in the lungs, little benefit is to be expected from change of climate; and a long journey will almost certainly increase the sufferings of the patient, and hurry on the fatal termination. Under such circumstances, therefore, the patient will act more judiciously by contenting himself with the most favourable residence which his own country affords, or even by remaining amid the comforts of home, and the watchful care of friends. And this will be the more advisable when a disposition to sympathetic fever, to inflammation of the lungs, or to hæmoptysis, has been strongly manifested.

It is natural for relations to cling to that which seems to afford even a ray of hope; but did they know the discomforts, the fatigue, the exposure, and irritation, necessarily attendant on a long journey in the advanced period of consumption, they would shrink from such a measure. The medical adviser, also, when he reflects upon the accidents to which such a patient is liable, should surely hesitate ere he condemns him to the additional evil of expatriation; and his motives for hesitation will be increased when he considers how often the unfortunate patient sinks under the disease, before the place of destination is reached; or, at best, arrives there in a worse condition than when he left his own country, and doomed shortly to add another name to the long and melancholy list of his countrymen who have sought, with pain and suffering, a distant country, only to find in it a grave. When the patient is a female, the objections to a journey apply with increased force. In these advanced cases the patient's sufferings may often be alleviated, and life prolonged, by confinement to apartments kept at a regulated temperature.

There are, however, cases of chronic consumption, in which the disease of the lungs, even though arrived at a very advanced stage, may derive benefit from a mild climate. The tuberculous affection in such persons is generally limited to a small portion of the lungs, and the system sympathises little with it. In instances of this kind, a residence for some time in a mild climate, especially when aided by proper regimen, may be the means of prolonging life. Likewise, in those fortunate but unhappily rare cases, in which the disease in the lungs has ceased to extend, and a long period must elapse before the work of reparation is completed, a mild climate will be of considerable service by improving the general health, and preserving the patient from the operation of many causes, likely to renew irritation in the lungs, and to which he would necessarily be exposed in this country.

In such cases, life may be preserved for many years by a constant residence in a mild climate, and by sedulously avoiding, at the same time, whatever is calculated to produce congestion, or excite inflammatory disease in the lungs. During my residence abroad, I met with several invalids labouring under this chronic

form of disease, who passed their winters in Italy with infinitely more comfort and enjoyment of life than in England.

Choice of Climate.—When change of climate is decided on, the next subject which naturally presents itself for consideration, regards the selection of that which is most suitable to the case. The question has been often put to me—which is the best climate? The truth is, no one climate or situation is the best in all cases. In a subsequent part of this work will be found the characters of the different climates usually resorted to by invalids, and a comparative estimate of their merits. With regard to the climates of the south of France and of Italy, I may here observe, that for consumptive invalids, in whom there exists much sensibility to harsh and keen winds, and, more especially, if immediate vicinity to the sea-coast is known to disagree, Rome or Pisa is the best situation for a winter residence. When, on the contrary, the patient labours under a languid, feeble circulation, with a relaxed habit, and a disposition to congestion or to hemorrhage, rather than to inflammation, and, more especially, when the sea-air is known by experience to agree, Nice deserves the preference. In cases complicated with gastritic dyspepsia, however, Nice is an improper residence: its climate being decidedly inimical to such a state. The climate of Hyères may be considered as nearly similar to that of Nice. The influence of such a morbid condition of stomach, in modifying all other diseases, is sufficient to claim for it the chief consideration in deciding upon the particular climate; although, I fear, it is but seldom thought of. Judging, however, from experience, I should say, that where this state of the stomach exists, a climate which is unsuited to it will do the patient little good, whatever may be the ostensible disease for which he is sent abroad.

With those cases of chronic consumption, therefore, to which I have alluded, and which, according to my observation, are almost invariably complicated with, and, I believe, in a large proportion of cases, chiefly induced by disorder of the digestive organs, Nice will decidedly disagree. Besides, such patients have generally an irritated state of the bronchial membrane, a dry skin, and a morbid degree of sensibility of the nervous system—in all of which states that place is unfavourable. Rome or Pisa will agree better with this class of invalids.

But the climate which, of all others, I consider the best suited to consumptive patients generally, is that of Madeira. It will be seen by a reference to the meteorological tables in the Appendix, and from the comparisons drawn, in the article on Madeira, between the climate of this island and that of the different situations on the continent of Europe, respecting which we have good information, that the winter temperature is considerably higher and more equable, and the summer heat much more moderate than at any of these places. For such consumptive patients, therefore, as are likely to derive benefit from climate, I consider that of Madeira altogether

the best. And this opinion does not rest merely on a consideration of the physical qualities of the climate, but is warranted by the experience of its effects. Madeira has also this advantage over all the places in the south of Europe—that the patient may reside there during the whole year, and thus avoid the inconveniences, and even risks, attending a long journey, to which consumptive invalids, who pass the winter in Italy, are exposed. The summer climate of the whole shores and islands of the Mediterranean, is unsuited to consumptive invalids; and, indeed, is known by experience to be so pernicious to them, that sailors and soldiers attacked with the disease in the Mediterranean fleet, and garrisons of Malta, &c., are sent to England on the approach of summer.

The two places which, from the character of their climate, approach most nearly to Madeira, are Teneriffe and the Azores. During the winter, the temperature of Santa Cruz, on the southern coast of Teneriffe, is several degrees higher than at Funchal; and, in this respect, would prove a superior winter climate for some pulmonary invalids.

The climate of Bermudas is changeable, and holds out no advantage to the consumptive invalid. That of the Azores, on the contrary, is remarkably mild and equable, and suitable to cases in which a soft and rather humid atmosphere is indicated.

But various circumstances require to be taken into consideration before we decide upon a particular climate in any individual case. The age and constitution of the patient, the peculiarities and complications of the disease; his ability to bear traveling, or a sea-voyage; the means at his command, and the friends by whom he can be attended, are circumstances which should be taken into account, in weighing the comparative advantages of different places, and the inconveniences attending all of them, when compared with the comforts and resources of home. These collateral circumstances may render it proper to recommend change of climate to one patient, when another, to whose case such a measure is equally applicable, will be better advised to remain in his own country.

The winter climates in England most favourable to consumptive patients are those of Torquay, Undercliff, Penzance, Clifton and Hastings. The choice among these places will depend upon the nature of the case, and especially upon the condition of the digestive organs. For persons of an inflammatory constitution, with a disposition to gastritic dyspepsia, Torquay will form the best residence, while it will as decidedly disagree with persons of a very relaxed habit, and subject to copious secretions from the mucous membranes, or to atonic dyspepsia. Such patients will bear the climate of Torquay for a very short time only. What has been said of Torquay, applies with equal force to Penzance, and the other parts of the Land's End. Undercliff, Hastings, and Clifton, will form preferable residences in the constitutions referred to.

In some cases, the relation of the disease to the climate is so

nicely balanced, that it may be advantageous to send the patient for a few months in the early part of winter to one place, and the remaining part of the season to another. Torquay, for example, may suit remarkably well for two or three months, at the end of which time it may be advantageous for the patient to change to a less relaxing climate. The winter at Torquay, or Penzance, and the spring at Clifton will suit some patients much better than continuing the whole season at any one of these places. For the particular character of their climates, and effects on disease, I must refer to the second part of this work.

During the summer, great advantage will be derived from frequent change of place in almost all cases, as will be pointed out in the article on *summer residences*.

There is one circumstance connected with the residence of consumptive patients, concerning which the profession are not quite agreed—I mean the preference given to a sea-side, or an inland situation. We have indeed, no very satisfactory comparisons on this subject, in which the nature of the climate, occupations, habits of life, &c., of the inhabitants have been fairly and fully taken into account, so as to enable us to judge how far the frequency of consumption, in any particular place, may be connected with the nature of the climate, and how much may depend on the mode of living, &c. The question is certainly a very difficult one, and involves a great variety of circumstances not easily analysed; hence it is, that we have little more than opinions, formed from imperfect data on the subject. From all that I have been enabled to learn and observe, consumption is, I think, *cæteris paribus*, more frequent on the sea-coast than in the interior;[1] still the greater mildness of many maritime places, as of those on the south and south-west coasts of England, may more than compensate for this difference, especially when these places are resorted to for a part of the year only.

In Italy, Rome is the only place, frequented by invalids, sufficiently remote from the sea to be considered as having an inland climate; and here the comparison is certainly in favour of the inland situation. But my impression is, that there is less difference between the sea-side and inland situations, in that range of latitude, than further north; perhaps owing to the greater dryness of the sea-side in southern climates. Of two climates, the physical characters of which were alike, the one on the sea-shore, and the other inland, I should prefer the latter as a residence for a consumptive patient, more especially if the disease were in an advanced stage; but I am ready to admit that this opinion is unsupported by any very accurate or numerous data. In America the opinions of medical men are greatly in favour of the interior.

[1] The comparisons in this respect, which have been made between the sea-coast and interior, of large continents, I do not consider applicable to small islands.

The idea that the air of a marshy country is beneficial in consumption, is now, I believe, entirely abandoned. Scrofula, and even consumption, is more frequent in many aguish districts, than in others of a different character; and an attack of ague is much more likely to favour the occurrence of consumption than to prevent it.

A sea-voyage is another measure, regarding which a difference of opinion prevails among professional men. My own opinion is, that a voyage is generally beneficial in the early stage of consumption. The sickness and vomiting are highly useful in many cases, and I believe, the unceasing motion of a ship, by the constant exercise it produces, is also very advantageous. It was to this chiefly, that the celebrated Gregory attributed the benefit derived from a voyage. Several striking instances of the beneficial effects of a sea-voyage in consumption, fell under my notice while in Italy; and Dr. Peebles, now of Edinburgh, whose long residence at Leghorn gave him a favourable opportunity of observing the effects of the voyage on consumptive patients sent from England to Pisa, met with many examples of the same kind. On examining the notes of the cases, with which Dr. Peebles favoured me, I find that hæmoptysis existed in every one of them; and this was also the case in most of the examples which came under my own observation. The circumstance of the patient being subject to hæmoptysis, in the early stage more especially, I should, therefore, consider as affording no objection to a sea voyage.[1]

In the consumptive cases, also, which are complicated with palpitation, or increased action of the heart, whether purely functional, or depending upon organic disease, I consider a voyage useful, and much preferable to a land journey. There are complications, on the other hand, which render a voyage unadvisable. When there is much nervous sensibility, a strong disposition to headach, and an irritable state of the stomach, a sea-voyage will generally disagree. With these exceptions, I should say, that a consumptive patient, in whose case a foreign climate is likely to prove useful, had better go by sea than by land, provided a vessel can be obtained with good accommodations. Much depends upon this last circumstance, and much also on the climate or season in which the voyage is made. The motives for preferring a voyage to a journey will be still stronger, when the patient has not the means of traveling in the most comfortable manner. Sailing or cruising for some time would be still preferable to a voyage; and the Atlantic is more favourable for this purpose than the Mediterranean. When a long voyage is objected to, shorter voyages, under favourable circumstances, and repeated at short intervals, might be of essential benefit. An objection to sea-voyages, is the length of time that the patient is necessarily confined to the close and relaxing air of the

[1] See Dr. Combe's Physiology, &c., already referred to, p. 107, for a remarkable example of the benefits of a sea-voyage.

sleeping places; but this is far more than compensated for by the facilities which he enjoys of being constantly on deck during the day, and there breathing the purest and most salubrious air. To take advantage of this with safety, however, let the invalid be provided with an ample store of warm clothing, and wrapped up sufficiently to be able to spend the whole time of daylight on deck without being disagreeably chilled.

The measures which have been recommended as necessary preparations for a long journey, are equally requisite in the case of a voyage—much of the benefit of which will depend upon the condition in which the patient is sent to sea, and the regimen he adopts while there.

When it is deemed proper to send a consumptive invalid abroad, his best residence will be found in one or other of the places which have been noticed: and when it can be so arranged that he may change his climate several times, it will generally be to his advantage. When change of climate is wisely adopted for the improvement of the general health, and before local disease is established, a far wider range may be permitted to the traveller. The whole south of Europe is open to him, and if he manages his voyages and travels judiciously, he may improve his health more than by remaining the whole season in any one place. But while great latitude may be allowed, over-exertion in traveling, and exposure to harsh cold weather, should be avoided, especially by the more delicate, otherwise they may lose more than they gain. The total want of proper accommodation and means of conveyance must also limit the extent of their wanderings.

In short, general rules only can be laid down for such cases. In the guidance of each individual, an outline is all that can be traced by the physician; but the use of a little common sense and discretion on the part of the traveller, will enable him to fill up the detail of his tour, so as to derive the maximum of benefit with the minimum of those disadvantages which are inseparable from all kinds of traveling.

With respect to the length of time requisite for a consumptive invalid to pass in a mild climate, in order to overcome the disposition to the disease, no general rule can be given. When the measure is had recourse to for the removal of the disordered health which precedes tuberculous cachexy, a single winter will be of great benefit, and possibly all that may be necessary. When tuberculous cachexy is established, and still more, when there is reason to suspect the presence of tubercles in the lungs, several years may be requisite, and in some cases it may be necessary to reside permanently in a mild climate.

When, by the influence of climate and other measures, pulmonary disease has been warded off, or when it has ceased to make progress, every thing calculated to excite irritation in the lungs should be carefully avoided; as a tendency to a return of the constitutional and local disorder remains long after the symptoms have

disappeared. Where the disease has advanced a step further, and a cure has nevertheless been effected during a residence in a mild climate, the patient should remain there for a considerable time (some years if possible) after every symptom of the disease has disappeared. The same plan of treatment, and the same climate which enabled the constitution to effect a cure, should be continued, if possible, till the respiratory organs and system have accommodated themselves to the new condition of the parts. This may, indeed, be such that the individual shall not be able to live in any other climate. Under whatever circumstances he may be placed, such a person must make up his mind to live with great regularity and temperance during the remainder of his life. He will bear neither full living nor much bodily fatigue; although regular and moderate exercise in the open air, and above all, riding on horseback, will be of the greatest service to him. Fulness and excitement, especially as affecting the pulmonary organs, are what he has most to dread. Although the disease has ceased to advance, the lungs cannot be restored to their former dimensions; they must remain diminished in capacity in proportion to the extent of tuberculous disease which existed. The chest can therefore neither be so fully expanded, nor the blood so freely circulated through the lungs as before. Hence, as the capacity of the respiratory organs is diminished relatively to the bulk of the body, there will be a constant tendency to a plethoric or congested state of the pulmonary system; and if the quantity and quality of the food, and degree of bodily exertion, are not adapted to the new condition of the lungs, hemorrhage or inflammation of these organs will be the consequence; and may speedily terminate a life, which, by a reasonable degree of attention and prudence, might have been prolonged many years. A mild and moderate diet, with abstinence from every thing exciting, can alone preserve such persons. The state of the digestive organs requires particular attention, as congestion in them will speedily lead to a similar state of the lungs; and when this plethoric condition of the abdominal and pulmonary circulation exists in a considerable degree, either hemorrhage from the bowels, or lungs, or apoplexy, or inflammation of some important organ, can scarcely fail to be the consequence. This, accordingly, is the manner in which such patients are often suddenly carried off. In these cases, therefore, the slightest indication of pulmonary congestion or inflammation, should be immediately attended to.

Artificial climate.—In place of sending consumptive patients to pass the winter in a foreign climate, it has been proposed to keep them at home, in rooms maintained at a regulated temperature. With the advocates of such a measure, the state of the lungs appears to be the only consideration; but, without improving the general health, by exercise in the open air, all our measures, directed to the local disease, will be of little avail—the removal of the constitutional disorder can alone afford the patient a hope of

recovery. In tuberculous cachexy, therefore, and even in incipient stages of consumption, particularly in young persons, I consider such a measure generally most inadvisable. But, in the advanced stages of consumption, when removal to a distant climate is worse than useless, life may be prolonged, in many cases, by keeping the invalids in apartments, the temperature of which is regulated, and the air maintained in a pure state. Females will, *cæteris paribus*, bear such a system of confinement better than males, from the circumstance of its being more congenial to their usual habits of life.

In cases of inflammation of the lungs occurring during the winter, in persons predisposed to consumption, keeping the patient entirely to the house, in a regulated temperature, till all symptoms of the disease have ceased, or even until the return of mild weather, will often be very judicious. But when a person so circumstanced has the means, he should pass the following winter in a climate where confinement will be unnecessary, and where he can improve his general health by exercise in the open air.

Comparing, then, the benefits to consumptive patients, likely to be derived from a mild climate, and confinement to rooms regulated to an agreeable temperature, there can be no question of the decided superiority of the former. But when circumstances preclude the possibility of changing the climate, and the patient is found quite unfit to bear exposure to the external air in this country, then confinement to apartments, properly and equably heated, is the best measure we can adopt to avoid the injurious effects of our cold, damp, and variable atmosphere, during the severe season.

Various plans have been tried for keeping up a uniform temperature, and at the same time preserving the air in a state of purity, but hitherto with very imperfect success. The common fire-place is the worst of all means, and strong objections attach to almost every other in use. The self-regulating stove, invented by Dr. Arnott, secures an equable temperature both night and day, at a minimum expenditure of fuel and trouble, The objection brought against it, in common with all other close stoves, that the apartments cannot be at the same time properly ventilated, can have arisen only from inattention on the part of the objectors to that portion of Dr. Arnott's work which treats of ventilating, and in which effectual means are described for securing this important purpose, not only in connection with the stove, but generally.

When means are adopted for insuring the escape of the impure air from the upper parts of the room, the ventilation may be made much more perfect with Dr. Arnott's stove than with a common fire.

But it is scarcely possible to maintain a steady temperature in one or two apartments, the doors of which have to be frequently opened, unless the air of the whole house is warmed on its first entrance. This may be effected by having a self-regulating stove in the lobby or entrance hall, through which the principal supply of

air passes. An additional reason for maintaining the air throughout the house at a certain degree of warmth, is, that it enables the invalid to leave his apartments without experiencing any material change of temperature in the stairs or lobbies.

In addition to any particular arrangement, for keeping up a constant ventilation, it would be of great advantage to have the windows completely thrown open for a few minutes every day, when the invalid leaves his room, in order that the air throughout the whole apartment may be completely renewed. The walls being always warm, the cold air admitted will very soon be raised to the proper temperature.

By thus securing purity as well as warmth of the air, not only in the rooms occupied by the invalid, but throughout the whole building, the injurious effects which would result to the constitution from passing the winter within doors, may be in a great measure obviated, and the utmost advantages which can accrue from it secured.

The invalid who has passed some months in an artificial climate, established within doors, should, previously to his first going out into the open air, habituate himself to changes in the degree of temperature in his apartments; and when he does venture out it should be with proper precautions.

The *respirator* will prove a valuable protection to him in the first instance, and for some time afterwards, on any sudden or considerable fall of temperature. Indeed, the habitual use of this instrument may, in some cases, be made a substitute for climate.[1] By maintaining in their houses a uniform and comfortable degree of warmth, both night and day, and by the use of the respirator out of doors, many persons who labour under chronic bronchial disease might escape the great aggravation of it, which never fails to distress them every winter. Those who dislike the appearance of the metallic respirator may contrive one for themselves, of a less formal appearance.

By keeping up the habit of going *daily* into the open air, in almost all weathers, under the protection of warm clothing, and, in certain cases, with the additional assistance of a respirator, during the prevalence of cold winds, persons with very delicate lungs may bring themselves to bear this climate, and even strengthen their constitution to an extent not generally believed. If, in addition to this daily exposure to the open air, for a longer or shorter period, according to the state of the weather, the temperature of our houses were better regulated, we should meet with much fewer examples of pulmonary and other diseases, generally attributed to the vicissitudes of our climate, but for which we are more indebted to the alternations of temperature created by ourselves, and the neglect

[1] Mr. Jeffrey has brought his respirator to a state of great neatness; and has reduced the price to the lowest rate, in order that the poor may avail themselves of it.

of those precautions and means of defence which are within our power.[1]

DISEASES OF THE LARYNX, TRACHEA, AND BRONCHI.

In no class of complaints, is the beneficial action of change of air and climate more speedily manifested, than in irritations of the organs of respiration. In the slighter bronchial affections, a change to a very short distance only, has often a remarkable effect; coughs ceasing in the course of a few days, which had resisted medical treatment for many weeks. But in protracted cases the disease assumes a more fixed character, and requires a thorough change of climate to produce much effect upon it.

Some previous treatment will generally be necessary to prepare the patient for deriving full advantage from such a change; and he should be made acquainted with the various causes likely to increase his disease while traveling. The long continuance of the disease is no reason for disregarding these precautions, as chronic inflammation may be easily excited during a journey into an acute form.

The next circumstance which requires attention in bronchial diseases, is the state of the digestive organs. Irritation of the lungs, more especially after the middle period of life, is very often a sympathetic affection, depending upon irritation of the stomach and duodenum and congestion of the liver. Accordingly, on tracing the progress of chronic bronchial diseases, we shall generally find that they were preceded for some time by a disordered state of the digestive organs. In such cases, the cure depends more upon the correction of the primary disorder, than upon the direct influence of climate on the organs of respiration. Indeed the chronic, and even the acute inflammations of the chest, are comparatively of easy management when the digestive organs are in a state of integrity—when the abdominal circulation is unembarrassed, and the various secretions connected with digestion, free and natural.[2]

When, therefore, the patient is suffering from dyspepsia, this should be remedied, as far as possible, before he leaves his own country; otherwise the change, so far from proving beneficial, may be injurious to him.

The skin will also require our particular attention, as it is seldom in a healthy condition in persons who have long laboured under bronchial irritation.

For the general management of such invalids during the journey,

[1] For some excellent advice on this subject I refer to Dr. Combe's Principles of Physiology applied to the Preservation of Health, &c., chapter vii., eighth edition.

[2] For some very judicious remarks on this subject, I beg to refer to the notes on the article *Pneumonia*, in Dr. Forbes' translation of Laennec.

I beg to refer to the article on that subject, at the commencement of the second part of this work; and to the article on "Disorders of the Digestive Organs," for directions respecting regimen; as these are strictly applicable to the class of diseases now under consideration. One remedy, however, namely, warm bathing, which is highly useful in dyspeptic complaints, requires to be employed with much caution in bronchial, and still more in tracheal and laryngeal irritations; and, unless by medical advice, it had perhaps better be omitted altogether in these cases during the journey.

Besides these important considerations, which the physician alone can regulate, there are some minor circumstances which claim the attention of the patient; and respecting which he can minister to himself. Persons labouring under irritation of the respiratory organs should be particularly careful during the journey, and, indeed, at all times and in all climates, to avoid currents of air. Although it is important that they should take daily exercise in the open air, when the weather is favourable, it is far better to remain for a few days within doors, than to expose themselves to a cold and humid atmosphere, or to cold winds.

To persons suffering from bronchial irritation, or who are very liable to that complaint, the application of cold water, or salt, or vinegar and water, to the chest and neck every morning, followed by active friction, is very useful. This practice might be generally adopted, with great advantage, at all seasons in this country, where colds and inflammatory sore throats are among the most prevalent complaints.[1]

By means of cold sponging or the shower bath, and friction, and the occasional use of the warm bath, with a steady perseverance in a mild regimen and regular exercise, particularly on horseback, a surprising change may often be effected in the health and feelings of delicate persons, and their sensibility to cold greatly diminished.

Warm clothing is particularly necessary, and flannel next the skin, during the day, I consider indispensable. When the trachea is the seat of the affection, the neck and upper part of the chest should be particularly well covered, during the winter and spring, with flannel or chamois leather. The lower extremities should be kept warm; and I wish it to be understood, that these precautions are as necessary in the south of Europe as in this country: for, although in the former the weather is altogether considerably warmer and drier, and the winter much shorter, than in England, the alternations of temperature are quite as great, while the houses are colder. The spring, too, in the south of Europe, is very irritat-

[1] "In my own experience," says Dr. Forbes, "the effect of sponging the chest with cold water and vinegar once or twice a day has proved of immense benefit to delicate subjects, and more especially to those liable to catarrhal affections, and to persons decidedly phthisical. In these cases, although no doubt the practice proves tonic to the system generally, I conceive its chief operation is in lessening the sensibility of the lungs to the impression of cold."—*Translation of Laennec*, 3d Edit. p. 98.

ing; and hence, during that season, the greatest circumspection is required, on the part of the class of invalids for whom I am now writing.

With respect to the best winter residence, I found Rome agree more decidedly with such patients than any other place on the Continent; and I repeatedly had occasion to compare its influence with that of the other climates upon the same patients. The climate of Rome is not, however, so beneficial when the disease is accompanied with copious expectoration, and a relaxed state of the system, as that of Nice; but in the dry tracheal and bronchial affections, the climate of Rome, and also that of Pisa, is preferable. Rome has several obvious advantages over the other residences on the Continent, for patients labouring under bronchial irritation. It is little liable to high winds, the air is soft, and the surrounding country well adapted for riding,—the best exercise for such patients.

But at Rome, the invalid labouring under bronchial disease will find reason for much self-denial. He must be cautious in his visits to the cold galleries and churches, and to such of the ancient ruins as are damp, or subject to currents of air, else he will run the risk of repeated relapses. During a strong northerly wind he should not stir out of doors. I have known a single ride, during the prevalence of this wind, produce a renewal of the disease in a patient who had been steadily improving for several months.

With the exception of cases in which there is a copious expectoration, and a relaxed state of the system, the climate of Madeira proves very beneficial, and is preferable to any part of the Continent. In this country, Torquay is the best climate in the dry bronchial irritations; for those with copious expectoration, a relaxed condition of the system, or an atonic state of the digestive organs, Undercliff and Clifton afford better climates. Invalids of this class may derive great benefit from a well directed tour during the summer, or rather frequent changes of air and place; for this is much more beneficial to them, more particularly if females, than a continuous journey. Traveling rapidly seldom fails to derange the system in some degree, and this will in a great measure be counteracted by short journeys, and resting at different places a week or ten days; at the same time, to be effectual, the tour should extend over a considerable extent of country, and all those precautions which have been suggested as necessary on a journey ought to be attended to.

It is scarcely necessary, after what has been said on diseases of the mucous membrane of the digestive and respiratory organs, to enter on the subject of similar diseases of the mucous surfaces of other parts. It may suffice to observe, that in chronic irritation of all these membranes, a mild climate will generally prove beneficial.

ASTHMA.

Asthma is a term applied in common language, to various diseases in which difficulty of breathing is a prominent symptom. In technical language it implies a disease in which the difficulty of breathing occurs in paroxysms. Asthma is very often sympathetic of a morbid state of some other important organ, as the heart, the digestive organs the womb, &c. Before recommending climate, or any other remedy, to an asthmatic patient, therefore, the state of these organs ought to be carefully enquired into. In almost all cases of asthma, the digestive organs are disordered. The skin is also very often dry, harsh, and not unfrequently affected with eruptions. The connection between the morbid state of the skin and this disease is rendered very evident, in some cases, by the first attack of asthma succeeding to, and apparently depending upon, the disappearance of some cutaneous complaint, which had been injudiciously removed by local applications, while the cause of it was neglected: this I have known to occur at the early age of five years.

In no disease, perhaps, is the effect of change of climate so conspicuous as in asthma. Taking the disease generally, it may be stated, that a removal to a warmer climate is highly beneficial; but the degree of relief will depend greatly upon the climate being suited to the particular case. We must not, therefore, prescribe for a name, but take into account the whole pathological condition of the patient, in order that we may be enabled to fix upon the climate best suited to his case.

The following forms of asthma require attention, in prescribing change of air or climate.

Pure Nervous Asthma.—It is difficult to say what place will agree best with this form of asthma. The general constitution of the patient, and his past experience in the particular quality of air which suits him, will assist us in deciding. This form of the disease is comparatively very rare, and I did not see a sufficient number of cases while abroad to enable me to state any thing very positive respecting the influence of particular climates on it. What very often passes for simple spasmodic asthma will be found, on closer examination, to be complicated with that diseased state of the mucous membrane of the lungs, termed *dry catarrh*, an affection which generally remains latent for a considerable time, and is very often overlooked; nevertheless it is a very frequent cause of asthma. In this form of disease, the climate of Rome will generally be found to agree well.

Humid Asthma.—This variety is asthma complicated with chronic bronchitis, and is one of the most common forms of the disease. It may be either idiopathic, or symptomatic of disordered digestive organs; in the former case, it is commonly much benefited by the climate of Nice; which is also often useful in the latter variety, although the amount of benefit will depend on the

kind and degree of the gastric affection of which the asthma is symptomatic. On this subject I need not repeat what has been already said in the articles on dyspepsia and bronchial diseases.

Cardiac Asthma.—Asthma dependent upon, or complicated with disease of the heart, may receive temporary relief from a mild climate; but the nature of the primary disease demands the chief consideration, as upon our power of abating it, must mainly depend our hopes of any permanent effect being produced on the asthma. When change of climate is adopted, in this complication, a voyage is preferable to a land journey.

In asthma complicated with chronic irritation of the bronchial membrane, or of the digestive organs, or with a congestive state of the hepatic system, or an unhealthy condition of the skin, a course of warm mineral water will prove of much benefit.

GOUT.

In the early stages of this disease, if the patient possesses sufficient resolution to adhere to a regimen calculated to remove the gouty disposition entirely, a residence for some time in a mild climate will greatly favour his endeavours.

In confirmed cases, when the joints are permanently affected, and when serious inroads have been made on the constitution, a mild climate very often improves the state of the general health, and prolongs the interval between the paroxysms.

The regimen of the gouty invalid, residing in the south of Europe, while it requires to be regulated according to the circumstances of the individual case, should also be adapted to the climate. If the disease is in an early stage, and a cure is expected, a very mild regimen is necessary; and, as a part of this, total abstinence from wine. In the chronic form of the disease, the previous habits of the patient must be taken into consideration, in regulating his regimen. A mild diet will, however, be more necessary in Italy than in England. Sweet acid wines, should be avoided; but the sound French wines, especially those of Bourdeaux, will soon be found to agree with the generality of such invalids; and, contrary to the general belief, prove less "gouty," and less injurious to the health, than the more spirituous wines of Spain, Portugal, and Sicily: abstinence from all kinds of wine is still better; and might, I believe, be often successfully adopted even in cases of gout of long standing.

Warm mineral waters, employed both internally and externally, prove very beneficial in chronic gout, and are well calculated, in many cases, to improve the general health, and restore the tone of the affected parts.[1]

[1] See Appendix on Mineral Waters.

CHRONIC RHEUMATISM.

A residence for some time in a mild climate proves of the greatest benefit in chronic rheumatism. Nice and Rome are the best climates on the Continent, according to my experience. Rheumatism is very often complicated with and kept up by a disordered state of the digestive organs, without the removal of which the affection of the joints can scarcely be cured. In cases of this nature, when gastritic irritation exists, Rome is the better climate; while, in the pure chronic rheumatism, Nice deserves the preference,—as it does also in those complicated forms of rheumatism, in which the disease exists in combination with an atonic or relaxed state of the stomach. In cachectic rheumatism, or that chronic affection of the joints dependent upon a cachectic state of the system, and when the disease is complicated with anomalous eruptions, Nice has also appeared to agree well.

When a winter passed in Italy fails to remove the rheumatism, I would recommend a course of some of the mineral waters on the Continent, known to be most beneficial in such cases.

DELICACY IN CHILDHOOD AND YOUTH.

There are two periods in early life, when a residence for some time in the south of Europe has appeared to me particularly useful.

The first is during childhood, from about the third or fourth year upwards. At this age children often become delicate and subject to catarrh on slight exposure to cold, to gastritic irritation, constipated bowels, swelling of the lymphatic glands, and other symptoms indicating a strumous disposition. In such cases a temporary residence in a warm climate proves very beneficial. During my residence in the south of Europe, I found the health of delicate English children, whether of a strumous habit or otherwise, very much improved by one or more winters in Italy. The mildness and dryness of the Italian winter, and, still more, its shortness, compared to that of this country, sufficiently explain the beneficial effects produced on the little invalids. Their delicate frames are not chilled so much, nor for so long a period of the year, as in our own climate, while they are enabled to be much more in the open air; a circumstance of the greatest importance to delicate children, and for the want of which nothing can compensate. I must here, however, restrict my praise to winter alone, as the summer in Italy has often an injurious effect upon such children, especially if the residence is prolonged beyond a single season.[1]

[1] The winter in Italy proves useful in difficult dentition, but summer is, in the same degree, pernicious. Infants in Italy should generally be suckled for a longer period than in England; and it is a rule never to wean them in the spring while teething.

Rome and Nice are, according to my observation, the best winter residences for children. The general characters of their climates, and the opportunities which the surrounding country affords for exercise, give these places a superiority over other towns resorted to by strangers in Italy. When the digestive organs are in an irritable state; Rome will be the more suitable residence. On the other hand, if there is a torpid, languid state of the constitution, Nice affords a preferable climate.

Children subject to chronic croup will derive advantage from a winter passed in Italy; for although this disease is generally connected with a disordered state of the digestive organs, it is often induced by exposure to cold and damp, in children predisposed to it. Croup is scarcely known in southern Italy; and among children who had previously had the disease, no relapses, I believe, occurred during my residence at Rome.

When there is a disposition to hydrocephalus (comparatively a rare disease, I think, in the south of Europe,) and when there is not much gastritic irritation, the same change of climate will be useful.

But by far the most important disease of childhood, and that which, when rightly understood, forms the key to the treatment of almost all diseases occurring at this period of life, is a disordered state of the digestive organs. This subject is, in my opinion, so important and so intimately connected with the design of the present work, that I deem no apology necessary for entering at some length into it.

Dyspepsia in Children.—A deranged state of the digestive organs is the source of most of the chronic, while it aggravates, and increases the danger from all the acute diseases to which childhood is liable, such as hooping-cough, measles and scarlatina. If neglected, it also leads to an unhealthy youth, and imperfect development of the body; but above all, it is the principal cause of that morbid state of the system which has been denominated tuberculous cachexy. In the hygeienic management of children, therefore, it is of the utmost importance that correct views should be entertained respecting the nature and causes of disorders of the digestive organs.

Dyspepsia may assume the same characters in childhood as in the more advanced periods of life, but by much the most frequent and destructive form of the disease is that which has been named by medical writers *Strumous Dyspepsia*, from its being intimately connected with scrofula in all its forms.[1]

The symptoms in the early stages vary much in degree in children of different constitutions. When not well marked they may

[1] Strumous Dyspepsia has been admirably described by my late lamented and talented friend Dr. Todd, in his able article on Indigestion, in the Cyclopædia of Practical Medicine. To that article I beg to refer the medical reader for a full account of dyspepsia in all its forms.

exist a considerable time without attracting much notice. The child is thirsty, feverish and restless in the early part of the night, and towards morning often becomes bathed in copious perspirations. The tongue is generally florid, and towards the point the papillæ are prominent and red. The appetite is variable; the bowels costive, and the motions generally pale; the urine is high-coloured or turbid. As the disease advances, the tongue becomes more loaded, the breath fetid, the countenance loses its natural colour and animated expression; the child looks pale and pasty, and the flesh is soft; the appetite is at times craving, and at other times there is no desire for food. If the little patient be neglected or improperly treated, the skin becomes harsh and dry, the abdomen tumid, the extremities waste, the eyelids are swollen and inflamed, and puriform discharges occur from the ears; the glands of the neck become enlarged, and cutaneous eruptions not unfrequently appear. The child is now on the verge of tuberculous cachexy, into which he soon lapses unless judiciously treated. Dr. Todd is of opinion, that this form of dyspepsia is more characteristic of the strumous or tuberculous disposition than any of the external signs which have been usually trusted to as its indications.

A change to a mild climate under such circumstances will be of the utmost advantage to the child. During summer, frequent changes of air will be productive of great benefit. In the early part of the summer, the interior,—and towards the end, and during the autumn, the sea-side will best suit such children. But no general measure of this kind should be adopted, till the morbid state of the digestive organs is in some degree corrected; and wherever a child goes, this should receive constant attention. For although the general health may be much improved by change of air, or climate, the improvement will not be permanent unless the congestion and irritation of the digestive organs, in which the disorder had its origin, and on which its continuance depends, are removed. With this view every means calculated to correct this state should be adopted. The most important is the regulation of the diet. This must of course be varied according to the age of the child, and the degree of congestion and irritation which exists. Generally speaking, the diet should be of the blandest quality, more especially in children of an excitable constitution. When the tongue is red, the skin hot at night, with thirst, milk and farinaceous food should constitute almost the sole nourishment. As the irritation abates, a little mild animal food every second day is allowable. For children of a more torpid character of constitution, who have little disposition to fever, when the tongue is loaded, and all the functions languid, a more exciting diet may be permitted. The warm bath and friction will be beneficial in all cases, more especially in the languid constitutions just alluded to. The great objects in the treatment should be, to regulate the diet, according to the sensibility and power of the digestive organs, to promote an active state of circulation in the surface and extremities, with a view to remove

the congestion and irritation of the internal organs, and to impart tone to the system. Without removing the morbid state of the duodenum, and the congestion of the liver and abdominal organs generally, it will be in vain to expect a free state of the circulation in the surface and extremities, a healthy condition of the skin, or the power of resisting cold. This irritation of the digestive organs influences every function of the body, and without its removal, all remedies directed to the improvement of the general health will produce only a partial and evanescent effect.

This is not the place to discuss the medical treatment, but I cannot resist the occasion of entering my *caveat* against the inconsiderate routine practice generally adopted in such cases. Active mercurial purgatives, an exciting diet of animal food, not unfrequently repeated several times a day, with the addition of porter or wine, or both; and this followed by steel and other tonics, constitute generally, in this country, the treatment of scrofulous children. Such a mode of treatment is at total variance with the gastro-duodenal irritation and hepatic congestion, which are present in a greater or less degree in all cases of scrofula. Besides this, complete want of success attends it in practice, whilst striking benefit is derived from an opposite plan of treatment.

When change to a distant climate cannot be accomplished, a residence in some of the milder situations in our own island will often be of great service in improving the health of delicate children. The sea-coast is considered the best residence for scrofulous children, and delicate young persons generally. This opinion, however, is not always correct; and even when sea-air is desirable, it is not a matter of indifference what situation is chosen. There is a considerable variety in the climate of the different places on the sea-coast resorted to by invalids.[1] For some cases of scrofula, a dry, bracing air, such as that of Brighton, will be the most suitable; for others, the more sheltered situations of Undercliff or Hastings; and the mild and soft climate of the south-coast of Devon will, in many cases, prove a very favourable winter residence; whilst during the summer months, a dry elevated part of the interior, such as that afforded by the Malvern Hills, will often be superior to any part of the sea-coast.

The second period of youth at which I consider a mild climate more decidedly beneficial, is about puberty. It frequently happens, at this age, that from pursuing a course of study too assiduously, especially during the debility consequent upon rapid growth, or from various other causes, the health is materially injured; the whole system is debilitated, and the changes which take place at this period of life, either do not appear, or do so imperfectly, and the development of the body is not fully accomplished. The young person loses his usual colour, plumpness, and strength; the face is pale, and the features are fallen; the skin dry and harsh, or relaxed

[1] See article on Consumption.

and moist, or the former state alternates with general or partial perspirations: cutaneous eruptions are also common; the feet are very liable to become cold; the bowels are constipated; the tongue loaded, and the digestive organs disordered. The nervous system is morbidly sensitive, and the temper irritable, or there is great mental depression, and the whole moral character is often remarkably changed: there is an indifference to the objects and pursuits which previously interested the mind, and a disinclination for either bodily or mental exertion. Tuberculous disease often shows itself under such circumstances, for the first time.

One of the most powerful means of preventing such disorders when threatened, and of removing them when they have occurred, is a temporary residence in a warm climate: and when the person is known to have a hereditary predisposition to consumption, the measure is more urgently called for; as the deranged condition of the system, if not soon corrected, may terminate in the constitutional disorder which we have seen to be the precursor and essential cause of consumption. If change of climate cannot be accomplished, the winter should be passed in some of the milder parts of our own island, where by exercise in the open air, warm sea-bathing, and a well regulated diet, much may be done to rescue the youthful invalid from the impending danger.

Although I have particularly noted early childhood and puberty, as the periods of life at which a mild climate proves signally beneficial, there is no period of youth at which it may not be had recourse to with advantage, under the circumstances pointed out.

CLIMACTERIC DISEASE.

We have just seen that climate may be made available for the correction and removal of derangements of health, occurring in youth and impeding the development of the body; we also find that, as age advances, and the system begins to feel the weight of years, climate proves highly beneficial in arresting premature decay.

At the age of from fifty to sixty, sometimes earlier, a remarkable change often takes place in the health, without any very obvious cause. The person's appearance becomes greatly altered; his strength is diminished, and he generally becomes thin, and looks aged. He is unequal to the mental and bodily exertions to which he has been habituated; and the consciousness of this frequently induces a depression of spirits and fretfulness of temper; or these may exist as direct effects of the bodily disorder. With the more general evidences of deteriorated health, some organs of importance to life, most frequently, the digestive organs, show symptoms of disorder. An habitual morning cough, with more or less of expectoration, cutaneous eruptions, swellings, and pains in the joints,

or nervous affections, chiefly of a painful kind, amounting even to tic-douloureux, often precede and accompany this state: or the individual lapses into a general cachexy, without much evident local disease. The whole system is, I believe, in these cases, in a morbid condition. If such a person is attacked with any acute disease, the constitution may sink under it with great rapidity.

This state constitutes what is not unaptly termed in common language "a breaking up of the constitution;" which, in truth, it generally proves to be, if not judiciously treated.[1]

These symptoms of premature decay originate often in too much mental exertion, close attention to business, and its consequent cares and anxieties; frequently they are the effects of a sedentary life and an habitual system of full living; more frequently still, they are the result of the combined influence of these causes. From whatever cause the disorder proceeds, one or two winters passed in a warm climate, with the adoption of such a regimen, and the use of such other remedial measures as the particular case may require, will prove of essential service in arresting the progress of decay, and restoring the invalid to a state of better health.

Dr. Warren, of Boston, United States, informed me, that he had frequently been struck with the beneficial influence which a visit to Europe had in renovating the health of his countrymen about the middle period of life, when the constitution had begun to flag, from application to business and the cares and duties of life: and he himself experienced, from his visit, a similar improvement in his own health.

The change of climate, in this case, is no doubt a very complete one, and is accompanied with all those favourable circumstances which contribute so much to aid climate in the restoration to health. Any thing, indeed, more likely to produce a favourable change in the constitution, and call forth its latent energies, than a visit to Europe by a citizen of the United States, can scarcely be imagined.

When a change of climate cannot be accomplished, great benefit may be obtained from a change of air in our own country; from the use of warm or tepid sea-bathing, and a course of such warm mineral waters as are suited to the case. But to derive permanent benefit from these measures, the invalid must henceforth change his mode of life, and eschew those causes which first brought him into jeopardy.

Persons just returned to Europe, and whose constitutions have suffered by a long residence in a tropical climate, will find great advantage in spending one or more winters in the south of Europe before finally settling in this country.[2] The great object in such

[1] See an excellent paper on the *Climacteric Disease*, by Sir Henry Halford, Bart., President of the Royal College of Physicians.—*Medical Transactions*, vol. iv. p. 316, &c.

[2] For some very judicious advice to persons returning from a warm climate, the reader is referred to Dr. James Johnson's Essay on Morbid Sensibility of the Stomach and Bowels as the Cause of Indigestion, &c. Tenth edition. 1840.

cases is to maintain an active state of the circulation on the surface and extremities, by warm clothing, exercise, friction, and the use of the warm bath. By these measures, any sudden change in the relative state of the circulation and secretion of the skin and internal organs, the consequence of a removal from a hot to a cold climate, will be obviated, and pulmonary and hepatic diseases prevented.[1]

Friction in particular may be made a most efficient means of promoting an active state of the cutaneous circulation. The flesh-brush, horse-hair gloves, or flannel, may be used, according to the sensibility of the skin; but the friction, to be effectual, should be active, and applied over the whole surface, particularly the extremities. Sponging the chest and arms every morning with cold water, will also aid in promoting the same objects. When the skin is torpid or relaxed, friction may be advantageously employed, before the cold sponging as well as after it.

When the biliary system is greatly deranged, a frequent occurrence with natives of this country who have passed some time in India, a course of mineral water will prove very useful, particularly after a winter spent in the south of Europe. Mineral waters are frequently found to remove what are commonly called biliary symptoms, indigestion, low spirits, &c., by restoring a regular and healthy action of the liver, of the bowels, and of the skin.[2]

There are various other states of impaired health, in which change of air and climate prove very beneficial. Indeed it would be difficult to name the chronic complaint, or the disordered state of health, which would not admit of being ameliorated by the judicious adoption of such a measure.

In the convalescence from fevers and other acute diseases, no remedy is so effectual in restoring the invalid to health, as a well-timed change of air; and if the disease has had its origin in causes dependant upon the locality, such a change is almost essential to recovery. But the amount of benefit to be derived from change of air will depend greatly upon the judgment with which it is employed both as regards the condition of the patient and the selection of the place. The convalescence from acute diseases should be fully established, before the removal is attempted, otherwise a relapse, in place of improvement, is very likely to be the consequence.

Ague affords an exception to this rule. In this disease the first

[1] The great prevalence of pulmonary diseases among the natives of tropical climates who come to this and other cold countries, is doubtless, chiefly owing to the influence of a cold and humid atmosphere upon their system. It is in such persons, and in young children, that tuberculous diseases are more speedily induced, and where inflammation appears more intimately connected with the production of tubercles. The rapid progress of the disease, in both classes of persons, is to be explained, principally, I believe, by the circumstances of their habit of body being that which is most disposed to tuberculous affections,—the most nearly allied to tuberculous cachexy.

[2] See Appendix on *Mineral Waters*.

intermission should if possible be taken advantage of to remove the patient from the situation in which it has occurred, and a farther residence in which will render the cure difficult. The remedies which will produce little effect upon an intermittent fever, in the locality where it originated, will often effect a speedy cure when the patient is removed elsewhere.

The selection of the place will depend in some measure on the nature of the complaint. It should always be of a different character from that in which the patient lives, more especially in the malarious class of diseases to which we have just alluded. For a person who has had acute pulmonary disease, a mild air and sheltered situation will be the most favourable, until the pulmonary irritation has subsided; after which another change to a more bracing air may be attended with great advantage, especially to persons of a languid and relaxed system. The object desired by the first change is to soothe and allay irritation in the affected organs; by the second, to give tone to the system generally. A succession of changes will in almost all cases prove more beneficial than a residence at any one place.

Children profit by change of air with surprising rapidity; and there are few cases of deranged health at an early age in which it does not merit the first rank in the list of remedies. Delicate females also benefit greatly; indeed, in proportion to the natural susceptibility of the individual, is the beneficial influence of a judicious change of air evinced. It is to the young and delicate the best and often the only admissible tonic; and we have daily occasion to regret the straitened circumstances which keeps many such patients lingering in a state between health and disease, in the confined air of the city, or in some equally unhealthy residence in the country, when they might be restored to health and vigour, by a temporary change to a purer air.

PART THE SECOND.

ON CLIMATES.

INTRODUCTORY REMARKS.

Besides *Directions* for invalids, before commencing a journey, while traveling, and during their residence abroad, a few observations on *Ventilation* and *Unhealthy Residences* may advantageously find place here, as the subject is one having immediate reference to that which has just been considered, as well as to that about to engage our attention.

Ventilation.—The necessity of pure air for the maintenance of health is so little understood, and the ventilation of houses in consequence so thoroughly neglected, that a few observations on the subject will not be out of place in a work, the chief object of which is to inculcate the value and direct the application of air and climate, as means of preserving health and curing disease.

Nothing contributes more effectually to strengthen the system, and render it capable of bearing the vicissitudes of climate, than the constant respiration of pure air. On the other hand, nothing tends more certainly to weaken and relax the constitution, and render it susceptible of the impression of a cold and humid atmosphere, than breathing impure air.

When an equable temperature combined with free ventilation is generally provided for in our houses, there will be a great improvement in the public health.

In the construction of a house, the dimensions of the bedrooms and the means of ventilating them, ought to be most important considerations, whereas they are comparatively little thought of. Nothing, indeed, can be constructed on a worse principle than the bedrooms in this country generally are. Their small size and their lowness render them very insalubrious, unless well ventilated; and the case is rendered worse by the close windows, and by the thick curtains with which the beds are so carefully surrounded, as if to prevent the possibility of the air being renewed. The consequence is that the occupants are breathing vitiated air during the greater part of the night, that is, during almost one half of their lives.[1]

[1] The remarkable lowness of the bedroom floors in numerous new houses at this moment building in and around London, affords abundant proof of the truth of these remarks.

These remarks, in regard to the importance of free ventilation in bedrooms are still more applicable to nurseries, school-rooms, and all places occupied by the young; as also to the work-shops of that numerous class of our population engaged in sedentary occupations.

To secure effective ventilation, or a continuous renewal of the air in all inhabited rooms, the pure air should be made to enter from below, and the deteriorated air to escape from above,—a circulation in accordance with the natural motion produced in fluids by difference of temperature, and prevented only by the ignorant interference of art. To understand the proper method of ventilating, we have only to attend to the currents which take place naturally in all inhabited rooms. Air, as it increases in temperature, or becomes loaded with watery vapour, has its weight diminished, and is forced up, if means are not taken to prevent it. Now the air in an inhabited apartment being both heated and generally combined with a portion of watery vapour, by respiration, &c., becomes specifically lighter, at the same time that it is vitiated, and the most impure part rises to the roof. If it had the means of escape, it would be gradually driven out by an equal quantity of pure air entering below, which, becoming heated and deteriorated in its turn would in a similar manner ascend and escape; thus would a continual renewal of the air go on without any trouble on our parts. Unless provision be made for the escape of the ascending current of impure air, no admission of external air will secure ventilation.[1]

Unhealthy Residences.—If it is necessary to secure proper ventilation within our dwellings, it is no less necessary that the air around them should be pure and salubrious. The best internal arrangements for ventilation, cannot change the character of the external air, nor prevent its injurious effects on the health of the inmates.

Persons living in low damp or confined situations, rarely enjoy that degree of vigorous health of which their constitution admits. Without suffering from any formal disease, they are subject to various complaints which often embitter their life, and render them much less capable of bodily and mental exertion than they would be, if placed in a situation more congenial to their constitution.

Dyspepsia, and its various concomitants, headaches, general nervous irritability, and a variety of anomalous nervous complaints, with languor and depression of spirits, may be enumerated among the evils resulting from a residence in unhealthy situations. All these ailments, in addition to others peculiar to the sex, are more severely felt by females, because they are more susceptible, and at the same time more confined to the influence of the locality in which they reside; and during infancy and childhood, the effects of a confined, humid air are most destructive; at this early age

[2] For more detailed explanations with respect to ventilation and the means by which it may be carried into effect, the reader is referred to Dr. Arnott's *Elements of Physics*, or to his Treatise on *Warming* and *Ventilating*.

scrofula is almost the certain consequence of residing in such a locality.

Under these circumstances, nothing affords so effectual and speedy relief as a change of residence, even for a short time, to a drier and more elevated situation, and a more bracing air. In very many instances, this is indeed the only means of restoring the person to a better state of health. The increase of strength and buoyancy of spirit—the mental energy, as well as bodily vigour, which persons residing in a close humid atmosphere experience on changing to a dry, open, and elevated part of the country, surprise and delight them, and they hope that this state of well-being may be permanent; but a return to their former residence soon convinces them that their feelings of increased health were temporary, and dependent entirely upon their change of residence.

Much might, no doubt, be done to improve the condition of many unhealthy places, by removing all obstacles to a free circulation of air, and all sources of humidity, especially stagnant waters, by draining, &c. But until the public are fully acquainted with the circumstances which require attention in the selection and preparation of situations for building, the complaints alluded to, and which may be fairly styled malarious, will continue more or less.

In a climate naturally humid, like that of Great Britain, it is of the first importance in the selection of a situation for building that it should admit of a free circulation of air and thorough drainage. In proportion as the soil is impermeable or retentive of humidity, so ought the site of the building to be high, in order to allow of sufficient fall for the water to drain off. Surface drainage around houses is also a measure which should never be neglected when the soil is retentive.

Trees and thick shrubbery close to houses are not only direct causes of impure humidity, but they act still more injuriously by impeding a free circulation of air, and the entrance of the sun's rays. This is one of the most frequent, and I may add, most powerful causes of insalubrity in country houses in England; and the case is frequently rendered worse by the addition of stagnant water, in the form of ponds. Many country houses, and indeed whole tracts of country are rendered unhealthy by the quantity of wood alone. The over-wooded state of the parks of many of the nobility and gentry, especially in a level country, is a fertile source of ill-health, often of positive disease, more especially in the autumn and spring, such as fevers, bowel complaints, rheumatism and other affections already alluded to, which, although not remarkable for severity, are not less causes of distress from their great frequency. Were trees around houses, and wood of all kinds, especially thick underwood, kept more distant, and were rank grass, stagnant water, and other obvious sources of impure humidity removed, and were more care taken to drain the surface soil, a marked improvement would be effected in the health of the inhabitants of the country

generally, and more especially in our thickly wooded and marshy districts.[1]

Directions for invalids making a change of climate.—I shall now endeavour to make the invalid acquainted with the circumstances which demand his more particular attention, previously to setting out,—during his journey, and after he is fixed in his new residence. This is a matter of the greatest consequence; and a want of due attention to it, is one of the principal causes why much less benefit is derived from climate than would otherwise be the case.

Too much is generally expected from the simple change of climate. From the moment the invalid has decided upon making such a change, his hopes are solely fixed upon it; while other circumstances, not less conducive or necessary to his recovery, are considered of secondary importance, and sometimes totally neglected. This is an error not always confined to the patient; his medical adviser frequently participates in it; nor is this difficult to be accounted for. The cases hitherto sent abroad have been, for the most part, consumptive, or other diseases, of long standing, in which the ordinary resources of our art have failed; therefore, when change of climate has at last been determined upon, the physician, as well as the patient, is disposed to look upon it as the sole remedy.

But, as I have witnessed, on a pretty extensive scale, the injury arising from this over-confidence in the unaided action of climate, and the consequent neglect of other things of no less importance, I particularly request the attention of invalids to the following remarks.

In the first place, I would strongly advise every person who goes abroad for the recovery of his health, whatever may be his disease, or to what climate soever he may go, to consider the change as placing him merely in a more favourable situation for the operation of other remedies in the removal of his disease; in fact, to bear constantly in mind that the beneficial influence of traveling, of sailing, and of climate, requires to be aided by such a dietetic regimen and general mode of living, and by such remedial measures, as would have been requisite in his case, had he remained in his own country. All the circumstances requiring attention from the invalid at home, should be equally attended to abroad. If in some things greater latitude may be permitted, others will demand even a more rigid attention. It is in truth, only by a due regard to all those circumstances, that the powers of the constitution can be enabled to throw off, or even materially mitigate, a disease of long standing, in the best climate.

It may appear strange to some of my readers that I should think it requisite to insist so strongly on the necessity of attending to

[1] If a board of health existed in this country, it would be part of their duty to draw up and circulate instructions for the construction of buildings, and the preparations necessary for rendering them healthy residences.

these things; but I witnessed the injurious effects of a neglect of them too often, not to deem such remarks called for in this place. It was, indeed, matter of surprise to me, during my residence abroad, to observe the manner in which many invalids seemed to lose sight of the object for which they left their own country. This appeared to arise chiefly from too much being expected from climate.

The more common and more injurious deviations from that system of living which an invalid ought to adopt, consist in errors of diet; exposure to cold, over-fatigue, and excitement in what is called "sight-seeing;" frequenting crowded and overheated rooms, keeping late hours, &c. Many cases have fallen under my observation, in which climate promised the greatest advantage, but where its beneficial influence was counteracted by the injurious operation of these causes. Every invalid who goes abroad, must make up his mind to submit to many sacrifices of his inclinations and pleasures, if he expects to improve his health by such a measure.

In order that the patient may derive advantage from his journey, or at least that his complaint may not (as often happens) be increased by it, some preparatory measures will generally be requisite before he sets out. Traveling is exciting to most people; and to those who have chronic inflammation of any organ, however latent or obscure, it very often proves injurious, particularly during hot and dry weather. Almost every one in health is sensible of the excitement arising from traveling. The appetite is generally increased, while the secretions and excretions are much diminished. The consequence is a degree of excitement of the system, not unaptly termed by travellers, "a heated state." What in health amounts only to a slight degree of excitement, easily removed by a few days' rest, and the employment of some common cooling remedies, often proves of serious consequence to the invalid who labours under, or is even disposed to any inflammatory affection.

When, therefore, the patient's disease is of an inflammatory nature, or threatens to assume such a character, his condition should be well examined before he commences a journey or voyage. If any undue vascular excitement exists, measures should be taken to reduce it by proper regimen,—by rest, by tepid bathing, &c.; and local, or even general bleeding may be requisite in some cases. Simple congestion, or an overloaded state of the vascular system, general or local, will also require to be diminished. In short, before one step of the journey is taken, all excitement or plethora should be removed, as far as the nature of the case admits.

Having his system in a proper state when he sets out, the invalid should endeavour to keep it so during the journey,—by adhering to a light diet, taking care not to overload the stomach even with the mildest food, by abstaining from wine and spirits of every kind, and by maintaining the regular action of the bowels. The latter object is best effected by laxatives, such as castor oil, and electuary of senna, or by the use of mild lavements. Purgatives of the more drastic kind, such as generally enter into the composition of pills,

are apt to irritate the bowels, increase an attack of hemorrhoids, a frequent consequence of neglected or irritated bowels while traveling. When such medicines are used they should be of the least irritating nature, and the dose so regulated as to produce a laxative effect only. The watery extract of aloes, with mastich and extract of hyosciamus, forms one of the best combinations. To these means of maintaining the system in a cool state, I may add the use of warm or tepid bathing, which should not be omitted where it can be conveniently procured, and when there are no objections to it from the peculiar nature of the patient's disease. When used with the necessary precaution it is free from danger, and will generally prove very useful in obviating the exciting effects of traveling. The temperature may be from 94° to 97° of Fahrenheit's thermometer, according to the feelings of the patient. The forenoon, or, rather, just before dinner, is the best period for taking the bath, and from twenty minutes to half an hour the proper time for remaining in it. By adopting the general regimen mentioned, and by traveling such distances only as the strength can bear, resting for a day when it is found necessary, the invalid will not only escape the injurious effects frequently produced by traveling, but arrive at his winter residence in a much better state of health than when he left his own country. This, I may observe, however, is a rare occurrence in the usual mode of conducting a long journey; for, even when no positive increase of disease is the result, the traveller has frequently sufficient cause to regret his inattention to the precautions above mentioned; as there is induced a degree of general excitement, and a deranged state of the secreting organs in particular; the injurious effects of which may be felt by a delicate constitution during a considerable part of the winter. The invalid thus not only loses the benefit which the journey might have produced, but, in part, that also which he would have obtained from his winter residence. If the invalid is wise, he will keep these things in mind. It is the duty of his medical adviser to prepare him for his journey, by allaying any excitement which may exist in his system, and by removing any other morbid affections with which the principal disease may be complicated, and which often form insurmountable obstacles to recovery.

Having his system thus prepared, the invalid should, on his part, endeavour to maintain it in the same state, by a strict adherence to the prescribed regimen. If, during his journey, his pulse should become frequent, his skin dry and hot, or if he has thirst or a dry tongue in the morning, or if his nights are restless, he may feel assured all is not right. He is over excited, either by too full a diet, by too rapid traveling, by exposure to a hot sun, or by the bowels being overloaded. In the generality of such cases, a few days' rest, and the use of some such cooling remedies as have already been mentioned, will allay the irritation; and the invalid may then pursue his journey, taking care to avoid whatever he has reason to believe excited him before.

Arrived at his place of residence, some measures of the same kind will probably be necessary; as it will rarely happen, that one shall reach the end of a long journey, even under the best management, without some degree of temporary excitement or derangement of the system. The invalid should, if possible, be spared the examination and selection of apartments, and particular care should be taken to have these thoroughly dry and ventilated before he enters them; this, I may remark in passing, is not to be done in any part of the continent of Europe, without the use of fires.

There are some other circumstances more immediately connected with the change of climate, which require to be noticed here. As the traveller advances to the south, the sensibility of the system is increased, and hence his mode of living should be regulated accordingly. Persons, for example, bear a diet in England which would prove too exciting to them in Italy: some articles of food, also, are more apt to disagree in the south; of this kind are fish, milk, and even vegetables, all of which should be used in great moderation by persons in delicate health. As soon, therefore, as a person changes his climate, he ought to adapt his manner of living to that which he has begun to inhabit. Besides the diet, the clothing also requires particular attention. This should be as warm during the winter in the south of Europe as in England. The feelings are altered in respect to temperature, and houses being relatively colder in Italy, warmer clothing is necessary within doors than in this country. It is advisable, also, to keep the whole apartment at a moderate temperature, and to avoid approaching too near the fire. To seek also too exclusively the sun's rays is a habit particularly injurious in the south of Europe, more especially during the spring. From these causes arise headaches, catarrhs, inflammatory affections of the chest, and even fevers.

This seems the proper place to say something of the best periods of traveling. With respect to the routes to the different parts of the Continent the ordinary *Guides* and books of *Directions* for travellers, contain such full information as to render it unnecessary that I should enter on that subject.

There are two seasons when the invalid, who means to pass the winter in Italy, may best leave England, early in June and early in September. In setting out at the former period, he may pass the summer in Germany or Switzerland,—a plan which will suit the health of many. By leaving this country in September, the summer heat will be avoided, and, by conducting the journey properly, the patient may enjoy a mild climate to the place of his destination. But to insure this, nothing should be allowed to interfere with the steady progress of the journey, except such periods of repose as the invalid may require. The best route will be through Switzerland, and across the Simplon. The proper time for entering Italy is the end of September, or early in October.

For Nice and the south of France, the period of departure need not be quite so soon. Although an invalid can scarcely have too

much time for his journey; inasmuch as, if conducted with judgment, and made at the proper season, it will be more beneficial to his health the more time it occupies, within reasonable limits. When the weather is chilly, the invalid should not commence his journey too early in the morning, nor until he has taken a light breakfast; and he should endeavour to arrive at his sleeping quarters before evening.

One of the most exciting things to a sensitive invalid is exposure to a powerful sun; this should therefore be sedulously avoided, by resting during the middle of the day when the weather is oppressively hot.

When there is a disposition to coldness of the extremities, it is of essential consequence to the well-being of the patient, to guard against this. If the surface and extremities are kept warm, a delicate person will often bear traveling in a very cool atmosphere, and even derive advantage from it. Persons with the slightest disposition to inflammation of the throat, trachea, or lungs, should avoid exposure to cold or high winds, or a powerful sun, and, still more, alternations of these, which are very apt to occur in valleys, and in crossing mountains. Invalids should also avoid approaching too near a strong fire in the evenings after a journey.

The foregoing observations I consider to apply, more or less, to all invalids going abroad for the benefit of their health: more minute instructions respecting the conduct of those affected with particular diseases, and while residing at different places, will be found in the articles devoted to the consideration of such diseases and places.

CLIMATES OF ENGLAND.

I shall commence my survey of climates for invalids, with the most favourable for winter residences in this country. In my account of these I shall have occasion to compare them with each other, and with the most esteemed climates in the south of Europe; both in regard to their physical qualities, and their influence on diseases.

The *Mild Region* of England admits of being divided into four districts, or groups of Climate; that of the *South Coast* comprehending the tract of coast between Hastings and Portland Island; the *Southwest Coast*, from the latter point to Cornwall; the district of the *Lands-End;* the *Western Group*, comprehending the places along the borders of the Bristol Channel and estuary of the Severn. We shall find that each of these regions has some peculiar features in its climate which characterise it, and distinguish it from the others, both as regards its physical and medical qualities.

LONDON.

As a point of comparison, and for other reasons, it will be useful to begin with a brief notice of the climate of the metropolis. London is indebted for the peculiarities of its climate to artificial circumstances chiefly. To the crowded assemblage of so many living beings; the multifarious processes ministering to their wants; the countless operations of art; the influence of buildings, &c. in retaining, augmenting and diffusing warmth, by reflection, by radiation, and in other ways. Besides these, the more indirect influence of perfect draining and paving, in contributing to maintain a dry state of the soil and atmosphere, must be taken into account. All these circumstances tend, some in a greater, others in a less degree, to the creation of a peculiar climate in London. As regards temperature, we have their influence very accurately demonstrated; but the subject becomes more difficult when we would discover the other elements which constitute the complex problem of climate.

The mean annual temperature of London is 50° 39, being one and a half degree above that of the environs.[1]

This difference of temperature between the metropolis and surrounding country is very unequally distributed throughout the year, and throughout the day. The excess of the city temperature is greater in winter than in summer. It is at its maximum in January, at which time it exceeds that of the environs by 3°. In the spring months, the temperature of the environs becomes nearly equal to, and in the month of May rather exceeds that of London. That accurate observer, Howard, further shows, that this excess of temperature of the city "belongs, in strictness, to the *nights;* which average three degrees and seven tenths warmer than in the country; while the heat of the day, owing without doubt, to the interception of a portion of the solar rays by a constant veil of smoke, falls, on a mean of years, about a third of a degree short of that on the open plain."[2] As was also to have been expected, the temperature of London does not show so extensive a range between its extremes, either during the year, the month, or the day, as the temperature of its environs; and the amount of variation between the successive days, which shows the steadiness of temperature, is also considerably less in the former than in the latter. Howard's observations, also, prove that although London is warmer than the country, it acquires and loses its heat more slowly. It will be the duty of the physician to decide how far this gain in warmth, (more particularly in the night,) in steadiness of

[1] The temperature of the environs is calculated from Howard's observations made at *Plaistow*, *Stratford*, and *Tottenham-Green*.

[2] The *Climate of London*, deduced from Meteorological Observations made in the Metropolis, and at various Places around it. By Luke Howard, Gent. Second Edition, vol. i. p. 237. London, 1833.

temperature, and in a greater degree of dryness and stillness, is counterbalanced by a diminution of the purity of the atmosphere, and of other qualities of climate. The benefit so often experienced by delicate invalids on coming from the country to London, in the winter or spring, is no doubt owing to the qualities of the climate above enumerated. It is during the night that the climate possesses the greatest advantages for the sensitive invalid; in addition to its warmth and dryness the atmosphere is then in its purest state, being free from the smoke and dust with which it is loaded and obscured during the day, by the numerous fires and the unceasing traffic of carriages, &c.

I shall not at present enter more fully upon the consideration of the Climate of London: its peculiarities will be made more apparent in the sequel, by the frequent comparisons which we shall have occasion to make between it and the other climates which we purpose to describe: and in the mean time, I can confidently refer those who are desirous of further information on the subject, to the excellent work of Mr. Howard, just referred to, and also to the memoir of Professor Daniel, in his ingenious *Meteorological Essays.*

THE SOUTH COAST.

This extensive and populous coast, from its vicinity to the metropolis, and more easy access generally, possesses several obvious advantages over the more distant parts of our Island. Various places along it are more or less frequented by invalids, who migrate from the northern and interior parts of the island in search of milder seasons; but here, as elsewhere, we have to regret that more registers of the weather have not been kept. For want of more general data, our observations can apply correctly only to Hastings, Brighton, Chichester, Gosport, Southampton, and Undercliff, in the Isle of Wight.

Were we to rest contented with the result of the mean annual temperature, we should find that there was very little difference between that of the South Coast and of London. But when we descend to particulars, we observe that there does exist a considerable difference in their temperature, arising from the mode of its distribution. It is because the higher degree of the temperature of London, and the interior of the island in summer, compensates for the lower degree in the winter, that the climate of these places appear to equal that of the South Coast. The mean temperature of the latter, however, during the winter months,[1] is from one to two degrees above that of London. The superiority is greatest in those months in the following order:—January, February, December. It

[1] It may be proper here to state that, in this work I adopt the more common division of the seasons; including under *Winter*, the months of December, January, and February; under *Spring*, those of March, April, and May; under *Summer*, June, July, and August; and under *Autumn*, September, October, and November.

diminishes in March; and in April the temperature of the coast falls nearly two degrees below that of London and its vicinity;[1] in May, it is a degree and a half, and in the months of June, July, August, and September, about one degree less. In October, the mean temperatures are nearly equal, but in November that of the coast begins to rise above the other.

It is important to remark, that the difference of temperature, in favour of the coast, during the winter, occurs principally between the *lower* extremes; so that the temperature of the day is nearly the same at both places, whilst that of the night is considerably warmer on the coast. For instance, the difference between the minima of Gosport and London, during the winter, is to the difference of their maxima as seven to three. The minimum temperature, observed on the South Coast generally, is from three to four degrees above the minimum temperature observed at London. Nor is the temperature of the South Coast subject to the same extent of range as that of London and the interior. Thus, the difference of the mean temperature of the warmest and coldest months in London is 26°, while at Gosport it is only 21°; and the mean of the monthly ranges at London is 34°, and at Gosport only 31°. In steadiness of climate, as deduced from the variation of temperature between successive days, the South Coast does not appear to possess any very remarkable superiority over London itself. Of the places on this tract of coast which have been particularly examined, Southampton is the most variable in its temperature, equaling in this respect the environs of London.

More rain falls on the South Coast than at London, the ratio being, as nearly as could be ascertained, as 30 to 25: but the quantity varies considerably at different parts. Of the places on this coast, frequented by invalids, Hastings, Brighton, and Undercliff, may be considered as having, respectively, peculiar climates.

HASTINGS.

This place has long enjoyed the reputation of being one of the mildest and most sheltered winter residences on the South Coast. Owing to its low situation, and the height of the neighbouring cliffs, it is protected in a considerable degree from all northerly winds. To those of the south it is fully exposed; and although the gales from that quarter are less violent on this coast than on that of Cornwall and Devonshire, still, during the winter season, southwesterly winds often prevail many days successively. In respect of the degree of protection from northerly and northeasterly winds, there is a considerable difference in different parts of Hast-

[1] On the parts of the coast which are more particularly exposed to the influence of the northeast winds, this difference of temperature between the coast and the interior is still greater, when estimated by its effects on the living body.

ings.[1] The lower situations facing the beach are particularly well sheltered by a perpendicular cliff which rises immediately behind them. Other parts of the town are more or less exposed, according to their elevation and aspect. In another point of great importance in the character of a winter residence for invalids, I allude to sheltered exercising ground, Hastings is not very favourably circumstanced. It is true, the parade affords a sheltered walk of small extent, close upon the beach, and there is a ride along the shore, through St. Leonards, which is protected by a range of cliffs from northerly winds; but it is the only sheltered ride of any extent in the neighbourhood.

With respect to the comparative merits of this climate, it may be observed, that its superiority in winter appears to be confined chiefly to the months of January and February. During these two months, and in the spring also, it has the advantage of being more effectually sheltered from north and northeast winds, than the other places frequented by invalids on the coast of Sussex. Hastings is said to be comparatively little subject to fogs in the spring; the fall of rain is also said to be less than at other parts of the same coast.

As might be expected from the low and sheltered situation of Hastings, it will be found a favourable residence generally to invalids labouring under diseases of the chest. Delicate persons, who require to avoid exposure to the northeast winds, may pass the cold season here with advantage. But in recommending Hastings as a residence in both instances, it will be necessary to take into consideration the influence of sea air; for, owing to the close manner in which this place is hemmed in on the sea by steep and high cliffs it has an atmosphere more completely marine than almost any other part of this coast, with the exception of St. Leonards.

Judging from my own observation, I should say that the climate of Hastings is unfavourable in nervous complaints, more especially in nervous headachs connected with, or entirely dependent upon an irritated condition of the digestive organs, and, also, in cases where a disposition to apoplexy or epilepsy has been manifested. But it will be understood from what has been already stated respecting the topographical relations of Hastings, that this effect of its climate is chiefly experienced in the lower or more confined parts; nor is such an effect peculiar to this place; it is common, I believe, to all places similarly situated. The class of persons alluded to, if induced to reside for any length of time at Hastings, should avoid the more confined situations below the cliff, and rather seek such quarters as are more open and elevated, yet in some degree protected from north and northeast winds.

[1] On the Curative Influence of the Southern Coast, &c., p. 23. Also, On the Adaptation of the Different Parts of Hastings to Different Diseases. By Dr. Harwood.

ST. LEONARDS.

This place is about a mile to the westward of Hastings, and, like it, possesses a dry and absorbent soil. St. Leonards is separated from the sea beach merely by a carriage road and broad esplanade, and lies along the base of a range of cliffs which protect it from northerly winds. The circulation of the sea atmosphere is more free and uninterrupted here than at Hastings, and the cliffs being lower, cold draughts, and counter-currents of wind from above are less experienced. The breadth and extent of its esplanade also, and the protection afforded by the colonnades for walking exercise, are circumstances of considerable importance to the invalid.

In other respects, the climate of St. Leonards may be considered as almost identical with that of Hastings.

Dr. Harwood thinks Hastings and St. Leonards most favourable for invalids from November to the end of February.[1]

In the extent and quality of accommodations, St. Leonards much exceeds Hastings.

Ague is not unfrequent in the neighbouring districts; but Dr. Harwood never knew an instance of a *visitant* being attacked with the complaint.

BRIGHTON.

Brighton has a climate in many respects the reverse of that of Hastings, the air being dry, elastic and bracing; yet even within the limits of Brighton a considerable diversity of climate is to be found. The true character of the Brighton climate belongs, in strictness, to the part of the town east of the Steyne; here the air is eminently dry, sharp, and bracing. That to the westward is somewhat damp, but milder. Delicate, nervous invalids are very sensible of this difference, and generally feel better in the western part. Those who suffer from a relaxed state of the system, enjoy their health more fully on the Marine Parade. The Steyne forms an intermediate climate, being sheltered in some degree from the cold northeasterly winds, on the one hand, and the boisterous southwesterly winds on the other.

Compared with the other parts of this coast, the climate of Brighton appears to the greatest advantage in the autumn and early part of the winter; when, as we have seen, it is somewhat milder, and more steady than that of Hastings. Accordingly, in all cases in which a dry and mild air proves beneficial, Brighton, during this period of the year, deserves a preference over every other part of the South Coast which I have had an opportunity of observing. During the spring months, on the other hand, owing to its exposure

[1] On the Climate of the Hastings Coast; Viewed in Reference to its Effects in Diseases of the Throat and Chest. By John Harwood, M.D., F.R.S.

to the northeasterly winds, this climate proves cold, harsh, and exciting to delicate constitutions. At this season, therefore, sensitive invalids generally, and more especially persons with delicate chests, should avoid Brighton. The climate of Hastings, as I have already remarked, is milder in the latter part of the winter and spring.

For convalescents, and all persons who require a dry and bracing air, and in whose cases the sea shore is suitable, Brighton presents one of the most favourable climates which can be selected. For children and young persons generally, it forms an excellent residence. A large proportion of invalids also, who require to pass the winter in the warmer parts of our island, may remain with great advantage at Brighton during the autumn. The weather is then generally mild, and favourable for exercise on horseback, or otherwise, particularly as from the calcareous nature of the soil, rain dries up with great rapidity. There is certainly something very peculiar in the influence of the air of Brighton upon the nervous system. I believe that relaxed nervous invalids, whom it does not irritate, feel more vigour and energy here than at almost any place with which I am acquainted; on the other hand, persons of an irritable nervous system, or those subject to gastritic dyspepsia, or a dry irritable state of skin, will not derive advantage from the climate of Brighton; on the contrary, their complaints will generally be aggravated by it. From the disposition to gastric irritation experienced at Brighton, invalids, and dyspeptic invalids in particular, should adhere to a mild diet, more especially on their first arrival.

From Brighton, the delicate invalid may remove during the winter and spring to the more sheltered situations afforded by Undercliff, Hastings, or Torquay, a plan which will prove more advantageous to many invalids than passing the whole season at any one of these places.

ISLE OF WIGHT.

The Isle of Wight, from the variety which it presents in point of elevation, soil, and aspect, and from the configuration of its hills and shores, possesses several peculiarities of climate and situation, which render it a very favourable residence for invalids throughout the year.

The part of the island adapted as a winter residence for invalids, is that denominated Undercliff, which comprehends a tract of country, extending from Dunnose to St. Catherine's Hill, on the southeast coast, about six miles in length, and from a quarter to half a mile in breadth. This singular district consists of a series of terraces, formed by the upper strata, composed of chalk and green sand, which have slipped down from the cliffs and hills above, and been deposited in irregular masses upon a substratum of blue marl. The whole of the Undercliff, which presents in many places scenery of the greatest beauty, is dry and free from moist or impure exhala-

tions, and is protected from the north, northeast, northwest, and west winds, by a range of lofty downs, or hills of chalk and sandstone, which rise boldly from the upper termination of these terraces, in elevations varying from four to six and seven hundred feet;[1] leaving Undercliff open only in a direct line to the southeast, and obliquely to the east and southwest winds, which rarely blow here with great force.

The physical structure of the Undercliff has been carefully investigated and described by the geologist,[2] and the beauties of its scenery have been often dwelt upon by the tourist, but its far more important advantages, as a winter residence for the delicate invalid, seem but recently to have attracted attention.

The continuous range of high hills which separates this district from the rest of the island, protects it most effectually from all northerly winds; while numerous short ridges, projecting from the main range towards the sea, break, in a considerable measure, the violence of the southwest winds. The protection afforded by this northern barrier is greatly increased by the very singular and striking abruptness with which it terminates on its southern aspect. This, in many places, consists of the bare, perpendicular rock of sandstone, in others, of chalk, assuming its characteristic rounded form, covered with fine turf and underwood; but so steep as to justify the appellation conferred on the beautiful tract which extends from its base to the sea shore.[3] The defence afforded by this natural bulwark against northerly winds is, indeed, more perfect than any thing of the kind I have met with in this country; and the transition of climate experienced on descending from the exposure of the open and elevated down to the shelter of the Undercliff, will remind the Italian traveller of his sensations on entering the valley of Domodossola, after quitting the chilly defiles of the Simplon, in an autumn evening. You feel at once that you have entered a new climate; and the luxuriance of the vegetable tribes, which you find around you, proves that the impression made on the senses has not been deceitful.

The whole of the Undercliff, however, is not protected in an equal degree. The eastern part, comprehending the country from Bonchurch to the village of St. Lawrence, a distance of nearly three miles, has, in this respect, the advantage over the western portion, which is more open to the southwesterly winds; but even here there are several very sheltered spots; and the temperature does not differ materially from that of the eastern division. The

[1] The height of the range is greatest at its two extremities; St. Catherine's Hill is nearly 900, and St. Boniface Down 800 feet above the level of the sea. The intermediate parts of the range vary from 650 to 700 feet.

[2] See the splendid work of Sir Henry C. Englefield, (which contains Mr. Webster's geological observations,) "A Description of the Principal Picturesque Beauties, Antiquities, and Geological Phenomena of the Isle of Wight." London, 1816.

[3] Undercliff, *i. e.* under the cliff.

whole extent of Undercliff is, indeed, sigularly protected from winds; and, I apprehend, it will be difficult to find, in any northern country, a tract of equal extent and variety of surface, and I may add, (as by no means a matter of indifference to the invalid,) of equal beauty in point of scenery, so completely screened from the cutting northeast winds of the spring, on the one hand, and from the boisterous southerly gales of the autumn and winter, on the other. The termination of the Undercliff towards the sea shore is in a range of perpendicular cliffs, of from forty to sixty, or seventy feet in height, rendering it far from being a close and confined situation, a circumstance of no inconsiderable importance. It may, therefore, be represented as a lofty natural terrace, backed by a mountainous wall on the north, and open on the south to the full influence of the sun, from his rising to his going down, during that season at least when his influence is most wanted in a northern climate.

Owing to its elevation above the level of the sea, the Undercliff differs from most of the situations on our coast, in being less exposed to the direct and immediate influence of the sea air; a circumstance which, in a medical point of view, deserves consideration. Sea fogs are rare, except towards the end of May and during June, when they are more or less prevalent. Observation has proved that less rain falls at Undercliff than on the south coast generally, and even than at other parts of the Isle of Wight, a circumstance which might have been inferred from a consideration of the topographical relations of the place. The soil, consisting chiefly of the detritus of the sandstone and chalk from the incumbent cliff, is naturally dry, and speedily regains its dryness after rain. The nature of the rock, and the general shelving form of the surface, likewise contribute to render Undercliff a dry situation.

The climate is remarkably equable as well as mild and dry, and there are not many days during the winter in which the invalid cannot take some exercise in the open air. The mildness of the climate, during the winter months, may be in some degree estimated by the circumstance of myrtles, geraniums, sweet-scented verbena, heliotropes, and other tender plants, usually withstanding the winter in the open flower borders. The honey bee likewise continues working, in ordinary seasons, until after Christmas.

To the invalid who has cultivated natural history, this sheltered district possesses an additional advantage. It is rich in varied and interesting plants, and the specimens of natural history, with which it abounds, offer abundant inducement to exercise and mental occupation to the cultivators of this delightful science.

When we consider the numerous local advantages of the Undercliff, already detailed, the result of the Meteorological Observations appended, and take into account the still more conclusive evidence furnished by the condition of the exotic plants which grow there: it is evidently one of the warmest climates in our island, and most eligible for a large class of our delicate invalids. With respect to

the most decisive evidence of all, in a medical point of view, I mean the effects of the climate on pulmonary disease, my experience is favourable.

I have certainly seen nothing along the South Coast that will bear a comparison with it; and Torquay is, I apprehend, the only place on the Southwest Coast which will do so. But much more extended observations than we at present possess for either of these places, are required to determine their comparative merits. With a temperature nearly the same, the climate of Torquay is soft, but humid and relaxing; while that of Undercliff is dry, somewhat sharp, and bracing. The winter temperature at these two places differs very little. Although at Torquay the temperature sometimes rises higher, it likewise sinks lower than at Undercliff, giving the latter the advantage over it in equability of temperature. These qualities peculiar to the two places render them respectively suitable in different diseases, in different forms of the same disease, and in constitutions of a different character. For pulmonary invalids, the best season to be at Undercliff is from November to May.

It is to be regretted, that with all the natural advantages of the Undercliff, the accommodations are far from what they might have been. Since the publication, however, of the last edition of this work, the accommodations for invalids have been greatly increased, and although my suggestions have not been strictly attended to in the construction and position of the buildings, they have been so in numerous instances. Some good houses have been erected at Bonchurch for the accommodation of invalids; each house is surrounded by a portion of ground, and care has been taken to interfere as little as possible with the natural beauties of the place. The little village of Ventnor is fast rising into notice; a handsome church has been erected, some good hotels established, and several houses built for the accommodation of invalids.

We have now to consider the advantages of the Isle of Wight, as a summer residence for invalids. The Undercliff itself affords a mild summer climate; but as a change of air and scene are generally beneficial to the invalid, the summer months may be better passed by many in still cooler situations in other parts of the island.

Niton, situated on the western extremity, but without the limits of Undercliff, affords a cool summer residence. It has also the advantage of being in the vicinity of some of the finest scenery on the island, and at no great distance from the celebrated Sand Rock Spring.[1]

Cowes is likewise a good summer residence. The accommodations for sea bathing are pretty commodious, and it is also conveniently situated for exercise on the water.

[1] This powerful aluminous chalybeate source issues from the cliff, at an elevation of one hundred and thirty feet above the level of the sea. It is the strongest mineral water of the kind with which we are acquainted, and is, indeed, too strong to be drunk without large dilution. According to the

The little village of Sandown, on the eastern shore, forms a retired and pleasant summer residence, and is well suited for sea bathing, having a fine sandy beach. Shanklin, in the same neighbourhood, is a favourite summer retreat, and one of the prettiest places in the island. But of all the situations in the island, Ryde appears to me to deserve a preference as a summer residence. It stands on the slope of a dry, gravelly hill, facing the north; immediately opposite Portsmouth; and from the fine open manner in which part of it is built, many of the houses having gardens attached to them, it possesses most of the advantages of a country residence, together with those of a sea bathing place. The neighbourhood is also very beautiful and favourable for exercise. The Isle of Wight thus presents a considerable variety of healthy and beautiful sites, suited to the wants of a large proportion of valetudinarians. The proximity to the metropolis, and the rapid and easy communication recently established by the Southampton railway, add greatly to its conveniences as a residence for invalids.[1]

CLIMATE OF THE SOUTHWESTERN COAST.

The south coast of Devon has a winter temperature nearly two degrees higher than that of the coast of Sussex and Hampshire,

analysis of the late Dr. Marcet, a pint, or sixteen ounces of this water, contains the following ingredients; the specific gravity being 1007.5.

Of carbonic acid gas, three tenths of a cubic inch.

Sulphat of iron, in the state of crystalised green sulphat,	41 grs.	4
Sulphat of alumine, a quantity of which, if brought to the state of crystalised alum, would amount to	31	6
Sulphat of lime, dried at 160°	10	1
Sulphat of magnesia, or Epsom salts, crystallised . .	3	6
Sulphat of soda, or glauber salt, crystallised . . .	16	0
Muriat of soda, or common salt, crystallised . . .	4	0
Silica	0	7
	107	4

From the resemblance of this spring to a celebrated mineral water in Sweden, Berzelius was induced to examine it. The results of his experiments confirmed the accuracy of Dr. Marcet's analysis. It has been found useful in the cure of agues, in some cases of dyspepsia, and in general relaxation and debility connected with uterine weakness, &c. For a full account of the medical virtues of this spring, I beg to refer to Dr. Lempriere's little work on the subject.* There is a hotel near the spring, and I would advise dyspeptic invalids especially, for whom this water may be prescribed, to drink it at the source.

[1] In terminating my observations on the climate of Undercliff, I must express my obligation to Dr. Martin, the resident physician in the district, for his able assistance. By continuing the series of minute and careful observations, on which he has already been engaged some years, Dr. Martin will soon be enabled to fix the character of the climate of Undercliff.

* Report on the Medicinal Effects of the Aluminous Chalybeate Spring, lately discovered in the Isle of Wight. By William Lempriere, M.D. &c. &c. Second Edition.

and from three to four higher than that of London.[1] The difference is most remarkable during the months of November, December and January; amounting, on the average, in the sheltered places, to five degrees above London. In February, the difference falls to three degrees, and in March and April, the excess of the mean temperature over that of London, does not amount to one degree. It ought also to be remarked, that this difference takes place principally in the *night;* as the difference between the lower extremes of London and the Southwest Coast, is to the difference of the higher extremes as four to three,—a less disproportion, however, than occurs between the South Coast and London. Hence, when compared with the latter, the days are proportionally warmer on the Southwestern than on the Southern Coast; whilst the nights at these places are nearly equal. The range of daily temperature is about the same on the Southwest and South Coasts, although, as has been remarked, less than at London. As regards the continuance of the same temperature, the Southwestern has a remarkable superiority over the Southern Coast; amounting nearly to three fourths of a degree; which is a very considerable difference, when we reflect that the whole amount of variation of successive days scarcely exceeds three degrees.

Different places on the Southwestern Coast possess these general qualities in a more eminent degree, according as they are more or less sheltered from northerly and easterly winds. Of these, taking them in succession from west to east, Salcombe, Torquay, Dawlish, Exmouth, Salterton, and Sidmouth, deserve to be particularly noticed. But many other sheltered spots may be found along this coast, as, for instance, in the neighbourhood of Plymouth, at Kingswear, near Dartmouth, and other places. But the great fault of most of these situations is, that their climate is too circumscribed to be of much utility to the class of invalids who are in a condition to derive the greatest advantage from a mild climate, I mean those who are capable of taking exercise in the open air. At a very little distance from the coast, several situations may be met with, still more completely protected from northeasterly winds, than most of the places situated immediately on the sea shore. Among these may be mentioned the village of Lympstone, about two miles from Exmouth, and Bishopsteignton, about the same distance from Teignmouth. To this class of situations, the village of Upton also belongs. All these places, while they are sufficiently near the coast

[1] Notwithstanding that public attention has been so long directed towards the climate of Devonshire, it is extraordinary how few are the materials which can be collected with a reference to the subject. It is to be hoped that this may not long continue to afford a ground of complaint. We should think it an object well worth the attention of the scientific institutions of Exeter, Plymouth, Bath, Bristol, &c. Were they to establish a series of simultaneous observations at different parts of the country for a few years only, the character of the climate of the southwestern part of England might be accurately ascertained.

to partake of the mildness of its climate, are beyond the more immediate influence of the sea air, and are more protected from the southerly gales, to which the whole coast is exposed. These circumstances deserve the consideration of the physician, while weighing the comparative merits of the two classes of places as residences for different invalids. The village of Heavitree, close to Exeter, although more inland, has the credit of possessing a mild winter climate. And this may be true, as far as regards the part situated on the southern aspect of the low hill on which the village is built; but the other parts are exposed to the whole range of northeasterly winds.

There are other sheltered spots in the immediate vicinity of Exeter, which would afford mild winter residences for invalids. But it will be found that, as we recede from the coast, the cold, especially during the night, is more intense, and the range of temperature greater. And, independently of this circumstance, the few accommodations to be found at all these places, with the exception perhaps of Heavitree, prevent them from being resorted to at present by invalids, except in a very limited degree.

SALCOMBE.

This small place, (the Montpelier of Huxham,) deserves notice here for its remarkable mildness. Yet, although it is perhaps the warmest spot on the Southwest Coast, its climate is limited to too small a space to admit of Salcombe ever becoming the resort of invalids to any extent.

There is unfortunately here a want of sheltered ground for exercise; and this I hold to be one of the greatest defects in a winter residence, for a large proportion of invalids. It is indeed chiefly for the advantage of exercise in the open air, that they leave the comforts of their own homes. In the immediate vicinity of Salcombe, there are two beautifully situated villas, Woodville and the Moult. At the former, under the shelter of a wooded hill, the American aloe has twice flowered in the open air, and with a degree of luxuriance almost equaling that which it displays in a tropical climate. The orange and lemon tree, also, thrive here, and ripen their fruit in the open air; the only protection they require during the winter, being that afforded by a covering of straw mat. These trees exhibit a degree of luxuriance and vigour, which I have seen in no other part of England, under the same circumstances. The olive tree has also occasionally produced fruit in this place.

TORQUAY.

The general character of the climate of the Southwestern Coast, is soft and humid. Torquay is certainly drier than the other places, and almost entirely free from fogs. This drier state of the atmosphere probably arises, in part from the limestone rocks, which are

confined to the neighbourhood of this place, and partly from its position between two streams, the Dart and the Teign, by which the rain is in some degree attracted. Torquay is in a great measure protected from northeast winds, the great evil of our spring climate. It is likewise well sheltered from the northwest. This protection from winds, extends also over a very considerable tract of country, abounding in every variety of landscape, in which the invalid may find at all times a sheltered spot for exercise either on foot or horseback. The beauty of the country around Torquay, and the extent to which it is sheltered from all winds, is an advantage which it possesses over all the other places in this district, and one of great importance to the invalid. It possesses all the advantages of the southwestern climate in the highest degree.[1]

The village of Tor, situated immediately behind, and on the high ground above Torquay, has been mentioned as a favourable residence for invalids. It is, however, considerably colder, and less protected from northerly winds than the latter place, and is also said to be damper. Just beyond Tor is the little vale of Upton, which affords one of the most eligible situations on this coast for establishing a Madeira village; being protected from southerly as well as northerly winds. Were houses built along the base of the hills, which bound this little vale, and the intervening space entirely laid out in open pleasure grounds for exercise, Upton would, I believe, form one of the most favourable winter residences for invalids in Devonshire.

DAWLISH.

Of the places on this coast, frequented by invalids during the winter, Dawlish appears to me to deserve the preference, after Torquay. Although less dry than the latter place, it is perhaps drier than the other parts of the coast. Dawlish is well protected from northerly winds, and also from the violence of the southwesterly gales. It is less protected from east winds, and this is more especially the case with the part of the town situated near the beach; indeed, this is much exposed to easterly winds. The part more distant from the sea is better protected; and there are also some well sheltered walks in this quarter. But Dawlish is altogether upon a small scale, and its confined situation must, I should think, render the air close and somewhat oppressive to many invalids, in calm, mild weather.

EXMOUTH—SALTERTON.

Part of Exmouth stands high, and is exposed to almost every wind, more especially to the southwesterly gales. The lower parts

[1] For a full and interesting account of the country the reader is referred to the Panorama of Torquay, &c. by Octavian Blewit, Esq.

of the town are protected from these, and, in a considerable degree also, from northerly winds. The situation of this part of the town, with respect to the river, exposes it, however, to occasional damp, as it did formerly to inundations from the sea in severe storms, with high tides. This latter inconvenience has been lately obviated by means of an embankment, which excludes the sea, and has thus allowed about sixty acres of what were formerly banks of mud to be converted into green meadows. There is here also a want of sheltered ground for exercise, and the place altogether does not appear to possess great advantages as a winter residence for delicate invalids, more especially for those labouring under pulmonary affections. Exmouth is, however, a healthy place; and I may remark here, that, notwithstanding the whole of this coast is rather humid, agues are almost unknown, as far as I could learn. A little way in the interior, they are not uncommon. Although Exmouth is not well suited for persons with delicate chests, other invalids often experience great benefit from a residence there, more particularly on the Beacon Hill, the most elevated and finest situation in the place; and which, as some compensation for the buffetings of the southwest gales, commands one of the most magnificent views in Devonshire. Along the southern base of this hill, there is also a road of considerable extent, protected from north and northeast winds, and well suited for exercise during the prevalence of these.

Salterton.—This village, about four miles to the eastward of Exmouth, presents advantages in point of situation which render it preferable to the latter place as a winter abode for the invalid. It stands in a small open valley on the sea shore, well protected from winds,—particularly northerly winds.

SIDMOUTH.

This place is situated on the sea beach, at the mouth of an open valley, through which the little river Sid runs; and would be fully exposed to northerly winds from the mountains, whence this stream takes its rise, but for the profusion of lofty and luxuriant elms and other trees, which shelter it partially in that quarter. Some of the houses at a little distance from the sea-beach are tolerably well protected from northerly winds; whilst Peak Hill and Salcombe Hill give protection in a considerable degree from westerly and easterly winds. Sidmouth seems well calculated for a summer and autumn bathing place; and, in the more sheltered situations mentioned, the invalid may find a suitable abode during the winter. The climate is damp, and in November, is subject to sea-fogs, which is also said to be the case with Exmouth.

In one or other of these places, the invalid may obtain all the benefit which a residence during the winter on the South Coast of Devon affords.

The influence of the southwestern climate on disease may be anticipated, in a great degree, from its physical characters, which

we have shown to be mild but rather humid, consequently soothing but rather relaxing. In one class of complaints, it is, therefore, calculated to prove decidedly beneficial,—in another, of an opposite character, equally injurious.

Pulmonary diseases are those in which the climate has been considered especially beneficial. But as there is considerable variety in the character of the different diseases to which the lungs are liable, as well as in that of the different constitutions in which they occur, so will the benefit to be derived from this climate depend upon its being applied to the proper cases. In chronic inflammatory affections of the throat, trachea and bronchi, attended with a dry cough, or with little expectoration, decided benefit may be expected. But when there exists in such cases a relaxed state of the mucous surfaces with copious expectorations, especially when occurring in a languid and relaxed constitution, the disease is more likely to be aggravated than diminished by a residence on this coast. From this statement will be understood the character of the more serious diseases of the chest, which are likely to be relieved by this climate.

In gastritic dyspepsia, it is serviceable; likewise in dysmenorrhœa, and the various nervous symptoms consequent upon it. On the other hand, this climate certainly exerts an unfavourable influence on all nervous complaints arising from relaxation or want of tone of the nervous system; on persons subject to nervous headaches; and in the purer forms of atonic dyspepsia, more especially when accompanied with a languid, relaxed state of constitution. Indeed, this form of dyspepsia is one of the most common complaints among the inhabitants of the coast; and it frequently happens that persons, who have come from a colder and more bracing part of the country to reside here, suffer much from this disease.

This climate will be found no less unfavourable to persons subject to menorrhagia and leucorrhœa, and in all diseases of the mucous membranes, attended with a relaxed state of the system, or with much discharge from the affected organs. In recommending a residence on this coast to invalids, it is absolutely necessary to attend to these distinctions, respecting the nature of their diseases and the character of their constitutions, otherwise frequent disappointments must be the consequence.

What may be the real estimation in which the climate of Devonshire ought to be held in consumptive complaints, and what may be its absolute effect upon these, I have much difficulty in saying: but this much I may venture to advance, that as the invalid will be exposed to less rigorous cold, and for a shorter season,—will have more hours of fine weather, and, consequently, more exercise in the open air,—he gives himself a better chance by passing the winter here, than in the more northern parts of the island. To compare it, also, in this respect, with the milder climates of the South of Europe, is no easy task. In the south, the invalid has finer days, a drier air, and more constant weather; but the transitions of temperature, though less frequent, are more considerable. In the

nights, I believe, invalids are often exposed to severer cold than here; and this arises partly from the great range of temperature, and partly from the imperfect manner they are protected from the cold of night, by the bad arrangement of the houses, chimnies, &c. To afford an opportunity of judging of the proper value of this last circumstance, I subjoin a comparison of temperature in-doors and out-of-doors, from observations made by the same invalid (a correct and careful observer) at Nice and Torquay.[1]

From the soft nature of the climate of this coast, and the relaxing and enervating effects which a long residence on it is liable to produce on many constitutions, invalids who mean to reside here during several winters, should leave it in the summer, and seek a drier and more bracing air. Such as are unwilling, or unable, to undertake a long journey, should retire to some of the drier and more elevated places at a little distance from the coast. Among these, Chudleigh deserves to be particularly noticed. It is finely situated on a ridge of limestone rock, beyond the range of the Haldon hills, and about five miles from the coast, and is esteemed one of the driest and most healthy sites in this part of the country. A more inland situation, and, from its vicinity to Dartmoor, possessing a still more bracing air than Chudleigh, is Moreton Hamstead; and this place, if suitable accommodations were to be found, would be a good summer quarter for invalids under the circumstances alluded to. Ilfracombe and Linton, on the northern coast of Devon, and other places in that beautiful and romantic region, afford excellent summer residences for some invalids. One objection to such a migration, which formerly existed in the badness of the roads, is now remedied by the formation of a new level line of road from Exeter to Barnstaple and Ilfracombe.

There is as marked a difference between the summer climate of North and South Devon, as there is between the cast of their scenery; the air of the former being keen and bracing, and its features romantic and picturesque, while in the latter, the rich softness of the landscape harmonises with the soft and soothing qualities of the climate.

CLIMATE OF CORNWALL.

The climate of the South Coast of Cornwall, in its general characters, as also in its influence on disease, resembles closely that of the South Coast of Devon, and has also long been resorted to by pulmonary invalids.

PENZANCE.

Penzance, as the chief residence of invalids in Cornwall during the winter, claims a particular notice; it is situated on the shore of the beautiful *Mounts-Bay*, about ten miles from the extreme western

[1] Appendix.

point of England, termed the Land's-end. Although situated on the shore of a bay surrounded by high land, Penzance can hardly be said to be sheltered from any wind; it therefore exhibits, in its meteorological results, the common features of the district in which it lies. Dr. Forbes was the first to point out the character of this climate; and it would have spared me much trouble and time, had I had the facility afforded me, in inquiring into other climates, for which we are indebted to Dr. Forbes in regard to this. A few such analyses, as his "Observations" present, would soon make the problem of the climate of this country, as regards all useful purposes, cease to be a desideratum.[1]

The mean annual temperature of Penzance is 52°.16, being only 1°.77 above that of London, But the temperature is very differently distributed over the year at the two places. Although Penzance is only a degree and a half warmer than London for the whole year, it is 5½° warmer in winter; 2° colder in summer; scarcely 1° warmer in the spring; and only about 2½° warmer in the autumn.

As regards the temperature of the different months, relatively with London, the greatest difference occurs in the following order, —December, January, November and February. In April, the difference is reduced to half a degree; in May, Penzance is 1° and in July, 2½° colder than in London; and the temperature does not again rise above that of London until the month of October. So that were one to give a graphical term of expression for the progression of the mean temperature of the two places through the year, that of London would more resemble an ellipsis, and that of Penzance the more equal figure of a circle. This will be aptly illustrated by observing, that the difference between the mean temperature of the warmest and coldest months in London is 26°, while at Penzance it is only 18°; and that, whilst in London the mean difference of the temperature of successive months is 4°.36, it is only 3° at Penzance. On examining the progression of temperature for the twenty-four hours at these two places, we find that, in winter, it is during the night that the greater part of this difference of temperature occurs; Penzance being nearly, on an average, six degrees and a half warmer than London during the night; and only little more than three degrees warmer during the day. But this equal distribution of heat throughout the year at Penzance, which we have compared so advantageously with that of London, is still more striking when compared with that of the South of Europe. Madeira and the Azores are the only climates which we have examined that are superior to Penzance in this quality.

The same remarkable equality in the distribution of temperature during the year at Penzance, holds equally true for the day;[2] and,

[1] Observations on the Climate of Penzance and the District of the Land's-end. By John Forbes, M. D.

[2] Thus in the winter of 1827–8, the mean daily range at Penzance was 7°.50; at London, at Gosport, Torquay, and Nice, it was 12°, 10°, 11°, and 11° respectively.

indeed, I may observe generally, that the progression of temperature for the year and the day, are faithful types of each other. I find, on comparing the months for a series of years, that the daily range at Penzance is little more than half that of the South of Europe; but in this quality, it also falls short of Madeira. And here is a proper opportunity of remarking, that although in mean temperature for the whole twenty-four hours, Penzance is considerably lower than that of the South of Europe, yet that during the night, through the winter, its extreme minimum temperature seldom is so low. It is during the day, only, that the South of Europe, as far as regards temperature simply, possesses a superiority. Thus, in winter, at seven o'clock in the morning, there is little difference between Rome and Penzance; but at two o'clock in the afternoon, there is nearly the difference of 7°. Indeed the whole advantage of Penzance, as compared with the South of Europe, appears to occur in the winter and during the night.

In the duration of the same temperature, as shown by the mean variation of successive days, the climate of Penzance excels all the northern climates, and nearly equals Rome and Nice in this respect.

As will have been observed, Penzance loses, in the spring, its superiority of climate. In April and May, it appears decidedly inferior to the more sheltered spots on the South Coast of Devon, and to Undercliff, and very much so to the Southwest of France. For instance, at Pau, the mean temperature during the winter is nearly 3° below that of Penzance, while during the spring it is 5° above it.

In the other elements of climate, this district has less peculiar advantages. There falls at Penzance about twice as much rain as at London. The number of days on which rain falls, does not, however, seem in proportion to the quantity of fluid precipitated. Mr. Giddy makes the average number of wet days, during seven years, 177.3, and he particularly states, that under this head he comprehends "rainy, showery, and misty days,—in short, all days on which there is any fall whatever, even a slight shower." The average number of wet days at London is 178, being almost precisely the same as that recorded by Mr. Giddy for Penzance. Of the much greater humidity of the atmosphere in Cornwall, however, there can be no doubt. The testimony of Dr. Forbes, who had ample means of forming a correct judgment, is very strong on this point. Another of the disadvantages of the climate of the southwestern extremity of our island, is its liability to violent and frequent gales of wind, and of this disadvantage Penzance appears to partake largely.

The effects of the southerly winds is to raise the temperature greatly, especially during the night. "During the prevalence of the south or southwest gales," says Dr. Forbes, "there is very little difference of temperature between the day and night, as proved by the register thermometer. Sometimes there is no difference whatever; and very commonly the minimum of the night is not more

than 3° or 4° below the maximum of the day. This shows how very completely the influence of the sun is excluded by the dense vapour with which the air is loaded; and during these *our moist siroccos*, we may say, without any metaphor, that we are breathing the breezes of a climate milder than our own. When these south and southwest winds, so prevalent in winter, are very gentle, the sky is often clear for many days together. On these occasions, the warmth and softness of the air are truly delightful; and when taken in conjunction with the beautiful scenery around Penzance,—the calm blue bay,—the gay green meadows,—the myrtles, and other exotic plants common in our shrubberies,—one is almost tempted to forget that it is winter landscape that he is contemplating."[1]

It is principally in consequence of its exposure to the northeast during the spring months, that Penzance is absolutely colder than the coast of Devonshire, or even the neighbourhood of Bristol, during this season. This circumstance of exposure to, or shelter from cold winds, constitutes the principal cause of the difference of different places, in the same line of climate, in point of warmth as experienced by man; for the influence of temperature on the living body is indicated much more accurately by our sensation than by the thermometer. Unless, therefore, the indications of the thermometer are corrected by observing the winds, we shall form very erroneous ideas of the climate of many places.

The only other place in this district that deserves particular notice is *Falmouth*, including the neighbouring village of Flushing. The winter temperature of Falmouth (which lies about thirty miles to the east of Penzance) is a trifle lower than that of the latter place, but the general qualities of its climate are nearly the same. In one respect, indeed, the village of Flushing, which is situated on the east side of the river Fal, (Falmouth being on the west,) has the advantage of Penzance, being much better sheltered from the east winds by the hills which rise immediately above it, and if it possessed good accommodations, erected in the best situation, this village would form a residence for invalids, during the spring months, superior to Penzance. Like many other places, however, favourably circumstanced as to shelter by hills, the local climate of Flushing is much too limited, from a deficiency of protected ground for exercise.

The disadvantages which attach to the climate of the Land's-end generally, in point of humidity and exposure to winds, are such, as in a great measure to neutralise the superiority which it possesses over the other climates of England in mildness and equability of temperature. In its general characters, this climate resembles so closely that of the south coast of Devonshire, that the remarks already made on the influence of the latter on disease, apply nearly to it. The climate of the southwest of Cornwall is still more relax-

[1] Op. citat.

ing than that of the south of Devon. Disorders, commonly termed nervous and stomach complaints, are unusually frequent among the lower classes. Diseases of the osseous system,—of the spine and large joints (mostly of a scrofulous character,) are also very common. Although not a strong race of people, the inhabitants of this district are, however, long lived.

Regarding the influence of this climate on consumption, we have the testimony of Dr. Forbes, founded on ample experience, that little is to be expected from it; but we ought to admit, at the same time, that, in this respect, it but shares the opprobrium with every other climate, in the advanced stages of that disease. "In a good many cases, however, of chronic bronchitis, simulating phthisis, the health was greatly improved, and in some it was completely restored, from a state of great debility and seeming danger. In a few cases, also, of young persons who accompanied their diseased relatives, and in whom the hereditary predisposition was strongly marked, if there was not already evidence of nascent tubercles,—a great and striking improvement in the general health and strength followed within a short period after their arrival, and seemed fairly attributable to the combined influence of change of air, scene and habits."[1]

The consumptive cases in which the soft humid atmosphere of this place is likely to prove beneficial, are those in which the disease is accompanied with an irritated state of the mucous membrane of the lungs, producing a dry cough, or one with little expectoration.

In idiopathic tracheal and bronchial diseases of the same character, whether complicated with asthma, or otherwise, and also in certain pure cases of the latter disease, it is likely to be very beneficial. When, on the contrary, there exists a relaxed state of the system, or a disposition to copious secretion from the bronchial membrane, whether idiopathic, or symptomatic of a tuberculous state of the lungs, or where hæmoptysis has occurred, I believe the climate of the Land's-end will generally prove injurious.

As a summer residence for invalids, and also as a residence during the whole year, the district of the Land's-end is, perhaps, equal to the coast of Devonshire. In the winter, however, and still more in the spring, the latter will, I believe, in most cases deserve a preference. If Penzance is somewhat warmer and more equable in its temperature, it is more humid and more exposed to storms during the winter, while it is rather colder, and less protected from the northeast winds during the spring. Aged invalids, with whom, in general, a soft climate agrees, and to whom even a moderate degree of humidity is not objectionable, might more particularly derive benefit by residing during the whole year at Penzance. The great mildness of the winter would enable them to be much in the open air, and they would have less to dread from the coldness of the nights than in any other part of England.

[1] Dr. Forbes's translation of Laennec's Treatise on Diseases of the Chest. Note by translator, 3d Edit. p. 73.

The country around Penzance is healthy, and affords a great variety of excellent rides and drives. Accommodations for invalids are numerous; and being a sea-port, the place affords convenience for water exercise during the summer. Invalids who have passed the winter at Penzance, and whose complaints are likely to be aggravated by the spring winds, might remove to Flushing or Fowey at that season; and some might even go to Clifton with advantage.[1]

WEST OF ENGLAND.

The mean temperature of the *Western Group* of climates during the winter is rather lower than that of the South Coast, but in March and April rises a little higher. Bath and Bristol, during the months of November and December, are nearly 3° warmer than London. In January and February they do not average 1° warmer; in March, Bath and Cheltenham are rather colder than London, but Bristol continues from one to two degrees warmer during March as well as April. On comparing Penzance with this tract, we find only 1° of difference in the mean annual temperature. In winter, however, Penzance is 4° warmer; but in the spring and summer it is somewhat colder. The distribution of heat throughout the year, is more unequal in this district than in the others; the difference of the warmest and coldest months being 28°, while it is only 26° at London, 21° at Gosport, 20° at Torquay, and 18° at Penzance. We find, also, that the range of temperature for the day and the month is considerably more than on the Southern and Southwestern coasts, and the Land's-end; the minimum term of temperature being from 3° to 5°, and even to 6° lower than at some of these places. In steadiness of temperature from day to day, it nearly corresponds with the South Coast, but is inferior to that of South-Devon, and considerably so to Penzance.

CLIFTON.

In this tract of country the vale of Bristol appears to be the mildest and most sheltered spot. The climate, during the winter, is mitigated by the vicinity of the great western ocean, while its land-locked situation protects it from the winds of that quarter. To those from the southeast it is fully open. The fall of rain in this district is less than from its western position might have been expected. The mountain ranges which flank the country bordering the Bristol channel,—those of Wales on the north, and those of

[1] For much interesting information respecting the natural history and antiquities of this district, I refer the reader to Dr. Forbes's tract, already referred to, and to his more recent and admirable essay on the *Medical Topography of the Lands-end*, in the Provincial Medical Transactions, vol. ii.; also to an amusing little work, entitled, "*A Guide to Penzance and the Lands-end*," written, it is said, by an eminent physician now resident in London.

Cornwall and Devonshire on the south, by modifying the course of the clouds from the Atlantic, appear to diminish the fall of rain in the intervening space. There is reason to believe also that this is even less at Bristol than the average of the surrounding district, a circumstance which may be accounted for, partly by its protection from westerly winds, and partly from its position with respect to the course of the Severn and its extensive estuary; from the nearest part of which Bristol is distant about five miles, and is, at the same time, completely shut out from it by the intervening high land. But however the circumstance may be explained, the fall of rain is absolutely less here than in Devonshire and Cornwall, and much the same as that on the south coast.[1]

The surrounding hills are composed chiefly of limestone, and this circumstance tends further to diminish the humidity of the atmosphere.

Clifton and its immediate neighbourhood, afford a considerable variety in point of shelter and elevation of site. The town is built on the southern declivity of a hill, at the bottom of which is situated the *Bristol Hotwells.* Here, and in the lower parts of Clifton, the most sheltered situations are to be found. And, accordingly, consumptive and other delicate invalids should seek the more protected spots in this quarter during the winter: while those requiring less shelter may reside on the higher but still sheltered parts of Clifton. The crescentic forms of the buildings in this place are singularly well adapted to the situation, as they afford protection to so many terraces, well suited for exercise during the prevalence of northerly winds. In the lower grounds there are also some sheltered walks, and towards the park several rides and foot paths which are tolerably defended from northerly winds. But, in this respect, Clifton, during the cold season, does not afford great variety. When, however, the weather is sufficiently mild to admit of the invalid going to some little distance from home, few places present more beauty or variety. The whole parish of Clifton is indeed well described by the late Dr. Chisholm, as "a beautiful and romantic assemblage of woods, rock, water, pasture and down. It seems indeed singularly well adapted to the maintenance of health; the soil resting on immense beds of limestone rock, exposed to the southerly and westerly winds, for nearly three fourths of the year; with an atmosphere elastic, vivifying—not humid."[2] The surrounding country is healthy, being free

[1] The average fall of rain for six years at Bristol, as given by Dr. Cole, is 31 inches. Penzance 44. London 25. There is reason to believe, however, that 31 inches is above the average fall. Dr. Carrick makes the mean of ten years, 1801 to 1810, only 24 inches; and the accuracy of Dr. Carrick's observation is supported by those of Col. Cupper, which give a mean of 23.76 for eight years (1800 to 1807) at Cardiff.—*See his Meteorological and Miscellaneous Tracts.*

[2] See an excellent paper, by this amiable and enlightened physician, on the Statistical Pathology of Bristol and of Clifton, in the Ed. Med. and Surg. Journal, vol. xiii. 1817.

from every thing like marsh. Dr. C. informs us that in the list of diseases admitted, during four years, into the Clifton dispensary, only one case of intermittent fever appeared, and that one was from the fenny district near Congresbury, about twelve miles to the westward of Clifton.

As far, then, as we are enabled to judge respecting this climate, from the obvious local advantages which it possesses, in point of shelter and aspect, and from the evidence afforded by meteorological registers, the vicinity of Bristol and Clifton appears to be the mildest and driest climate in the west of England, and consequently the best winter residence, in that part of the country, for invalids.

Compared with the South and Southwest Coasts, the spring is the period of the year during which this climate appears to the greatest advantage. This season, as we have already seen, is warmer here than on the South Coast, (with the exception of Undercliff,) whilst it is equal to that of the warmer parts of the Southwest Coast. When the climate of Clifton is compared more closely with that of Devonshire, it may be characterised as drier and more bracing than the latter, and as more exciting to most consumptive patients, and to those labouring under irritable affections of the bronchial membrane. For such cases, the softer and more humid air of Devon will be found more soothing; while for invalids, whose constitutions have suffered from long continued derangement of the digestive organs, or a congested state of the mucous membranes with copious secretion, and also for young scrofulous persons, and those of relaxed habits of body generally, Clifton will prove a preferable climate. And this gives me an opportunity of repeating, that in comparing climates together, as regards their influence on diseases, the constitution of the patient, and the particular nature of the disease, must be taken fully into consideration in deciding on their respective merits in each individual case.

But the advantages of Clifton, as a residence for the invalid, are not limited to the winter; it affords also a very favourable summer climate. Indeed, the higher situations on Clifton Hill are as eligible during the latter season, as the lower and more sheltered parts are during the former. A more complete change of air than this, however, will in general be advisable, when there are not material objections to traveling. The interior parts of the same district, as about Cheltenham, and, still better, the hills of Malvern, one of the coolest and most healthy summer residences in England, will suit many invalids. For young persons of a scrofulous constitution, the summer climate of Malvern is admirably suited. Others may pass the summer with more benefit among the mountains of Wales; and in cases in which a course of goat's whey promises advantage, this will be the preferable plan. Abergavenny is, I believe, the most esteemed station for this purpose. Several healthy and convenient places present themselves on the opposite coast of Wales, as at Aberystwith, Tenby, Barmouth, &c., which form good resi-

dences during the latter part of summer and the autumn, more especially when sea-air or sea-bathing is indicated. These places, from the accommodation of steam vessels, may be reached by a voyage of a few hours; a circumstance of material consequence to the invalid unable to bear the fatigue of a journey by land.

In its local advantages and geographical position, therefore, Clifton affords peculiar advantages as a residence for a large class of invalids. Within its own limits it affords a sheltered winter and spring, and an open airy summer and autumn residence; whilst it is surrounded by numerous places of convenient and agreeable resort in the fine season, suited to the various classes of persons who may seek its shelter during the winter.

Bristol Hot-well.—I must not quit Bristol without some notice of the once celebrated spring which formerly, indeed, was the chief object of attraction at this place for invalids. The virtues of this source were then as much overrated as they appear now to be underrated. Yet I believe many of the valetudinarians, who frequent Clifton on account of its climate, might derive benefit from the use of this water.

According to Dr. Carrick's analysis, made in 1797, it appears to be a very pure water, having at its natural temperature of 76°, a specific gravity of only 1.00077. It contains a very small proportion of lime, soda, and magnesia, in combination with the carbonic, sulphuric, and muriatic acids; but a considerable proportion of free carbonic acid, and a little atmospheric air. The presence of the fixed air, together with its temperature, renders this water grateful to the stomachs of most persons. Dr. Saunders has well characterised it as a pure, warm, slightly acidulated water; and even as such it will, I have no doubt, be found useful in many cases of dyspeysia. Like some other natural warm waters, it is said to be very efficacious in allaying the thirst which accompanies the paroxysms of symptomatic fever; and Dr. Riley, of Clifton, informs me that he has found it of essential service in several cases of diabetes. But it is chiefly in a deranged state of the digestive organs that it is indicated. In the nervous forms of dyspepsia, when the stomach is in a languid state, and does not tolerate cold fluids, it will prove useful. During the spring, several tumblers drunk before breakfast, with exercise on foot or on horseback, according to circumstances, will, in many cases, greatly favour the effects of the climate, in restoring the energy of the digestive organs, and thereby improving the general health. It may be advantageously used also as a common drink at meals. But I venture these opinions, rather on the experience of others than my own.

ISLAND OF BUTE.

This island lies in the Frith of Clyde, about eighteen miles below Greenock, and is almost surrounded by the lofty hills of the opposite coast. It is eighteen miles in length from east to west, and from four

to six miles in breadth. The highest parts of it are not more than 140 feet above the level of the sea.

The temperature of Bute never falls low during winter, nor rises high in summer, so that its yearly range is comparatively limited—under 40°, which is at least 15° less than what it is at Glasgow. The temperature will more frequently rise above 75° at Glasgow, than above 70° at Rothsay in Bute; and oftener sink below 20° at Glasgow, than below 30° at Rothsay.

Snow, when it does chance to fall, seldom lies longer than a few hours. During severe and long-continued frost on the mainland, and when the surrounding hills there are for many weeks covered with snow, a little may be seen on the higher parts of Bute; but even then the temperature on the lower grounds is rarely under 28° during the night, and 34° during the day. In the whole course of twelve years of the most careful and accurate *hourly* observations, the thermometer never fell lower in Bute than 20° above zero of Fahrenheit's scale, and on three occasions only was it nearly so low. On one of these the thermometer in the Botanic Gardens at Glasgow, indicated 5° below zero. This was indeed the greatest difference observed during these twelve years; but in very severe frost the difference was often from 10 to 15 degrees. In ordinary weather there is no marked difference of temperature; but in very hot weather, the thermometer in Bute does not rise so high by several degrees as on the mainland.

Every part of Bute is not equally sheltered and mild during winter. The eastern is much milder than the northern coast, owing to its being in some measure protected from the influence of the north wind.

The climate of this island may be characterised as mild and equable but rather humid. It resembles in character that of the southwest of England, and France, and of the Channel Islands, though considerably less warm than any of these. As a winter residence for invalids, it holds out considerable advantages to that class only for whom a soft, equable, but rather humid atmosphere is indicated.

The observations which have been made on the character of the diseases benefited by the climates alluded to, apply to that of Bute.[1]

COVE.

Cork Harbour, on the southern shore of Ireland, is an ovoid

[1] We are indebted to Mr. Thom for the most complete account of the climate of Bute that was perhaps ever kept of any place. In the Appendix will be found, a meteorological table, the results of twelve years' hourly observations, which Mr. Thom had the kindness to draw up at my request. It is to be hoped that he may publish the whole of the data from which this table is calculated, as they constitute the most complete series of meteorological observations perhaps ever made, and at this moment, when the attention of men of science is particularly directed to the subject of meteorology, their publication is most desirable.

basin, above seven miles by five, surrounded by the mainland. Within, and on the northern side of this harbour, lies the island of Cove; the extreme length of which, from east to west, is seven, and its greatest breadth, three and a half miles. The island consists of two hills, from two to three hundred feet high, running from east to west; the northern ridge forming the chief body of the island. The town of Cove, containing about eight thousand inhabitants, is built on the southern acclivity of the southern hill. It consists of terraces rising from within a few feet of elevation above water mark to a considerable height, and in a crescentic form, facing the south. From its position and configuration, the town is sheltered from northern winds, on the one hand, and, on the other, is open to the full influence of the sun.

The accommodations for invalids are good, and the walks and drives well sheltered. The facilities of intercourse between Cove and other places are frequent, and are daily increasing.

The following observations, by Dr. Scott, relate to the lower part of the town of Cove.

The mean annual temperature, deduced from the mean observations of the three years from September, 1834, to August, 1837, and made up of the mean maximum 56°.7, and mean minimum 46°.5, amounts to 51°.6. The mean dew-point 46°. The fall of rain 33.299 inches, and the evaporation, calculated from the mean temperature and dew-point, about 25.643 inches.

Fall of rain in winter 10.565 inches, and number of rainy days 35. In spring, the fall is 4.06, and the number of rainy days 28.

The number of days of frost and snow, in winter and spring, is very inconsiderable. Snow seldom lies longer than a few hours.

The duration of each wind, during the three years, was:—from the south, 96 days; southwest, 222; west, 159; northwest, 213; north, 132; northeast, 84; east, 78; and southeast, 111.[1]

From these observations, and the comparisons given in the Tables on English climates, Cove appears to be one of the mildest climates in Great Britain; being inferior in point of temperature to Penzance only, during the winter months, and to the same place and Torquay only during the spring. In point of dryness, Cove does not stand so high in the table of comparison. The winter is, comparatively with the other places, the season during which the greatest quantity of rain falls.

In its general characters of climate, and the influence of this on disease, Cove corresponds with the southwest of England, and other similar climates.

The subjoined tables exhibit the temperature, the fall of rain, and the number of rainy days during the winter and spring, at the principal places in Britain resorted to by invalids.

[1] Dr. Scott, on the Medical Topography of Cove.—*Dublin Journal of Medical Science*, vol. xiii. To this elaborate and excellent paper I am indebted for the information contained in the above article on Cove.

COMPARATIVE TEMPERATURE OF PLACES TAKEN BY REGISTER THERMOMETERS.

Places.	Mean Temp. of Winter	Mean Temp. of Spring	Mean of the two seasons	Number of years' Observation from which the Means are taken.
London	39.12	48.76	43.94	Nineteen years.
Hastings	40.11	45.77	42.94	For winter, five years, including severe winter of 1837–38; for spring, four years.
Undercliff	42.52	48.83	45.67	For winter, six years, including severe winter of 1829–30. Spring, two years.
Torquay	39.83	50.83	45.33	Two years, including severe winter of 1829–30.
Penzance	44.03	49.63	46.83	Ten years.
Cove . . .	43.90	49.43	46.66	Three years.
Bute . . .	39.62	46.66	43.13	Nineteen years.

COMPARATIVE QUANTITIES OF RAIN CALCULATED IN INCHES.

Places.	Mean quantity for Winter.	Mean quantity for Spring.	No. of rainy days. Winter.	No. of rainy days. Spring.	Number of years' observation from which the Means are taken.*
London	5.85	4.80	48.0	43.0	Twenty years.
Hastings	7.44	3.86	38.2	27.2	For winter and spring, 3 years, including the rainy seasons, 1838-9, 1839-40.
Undercliff	6.17	3.83	43.0	19.5	Three years, including the rainy seasons, 1838–9, 1839–40.
Penzance	12.64	9.35	50.7	40.6	Twelve years.
Cove . . .	10.565	4.06	35.0	28.0	Three years.
Bute . . .	10.17	7.21	44.7	32.5	Nineteen years.

* The number of years' observations, from which the number of rainy days is deduced for London and Undercliff, is respectively ten and two. The number of years for the other places is as in the Table.

In bringing to a conclusion this brief account of the warmer situations in our own country, it may be expected that I should apply the preceding observations on the physical characters of their climates, to the object of our researches, and say, what are the advantages which these situations hold out generally to invalids, and what are the diseases in which they are respectively beneficial.

The whole of these places, as we have seen, are considerably warmer during the winter and spring than England generally, and very much warmer than the colder parts of it. Indeed, as I have shown, and as a reference to the tables in the Appendix will further prove, there exists as much difference in regard to temperature, and its distribution between the northern and southern parts of England, as between the latter and the south of Europe. Now as the influence of temperature on the living body is, in a great degree, relative, an inhabitant of one of the coldest parts of this country would, it is reasonable to believe, feel the influence of the climate of the south of England (as far, at least, as regards temperature) as much as an inhabitant of the latter would that of the south of Europe.[1] An invalid, therefore, from Scotland, or the north of England, will find, in the places above mentioned, a climate, compared with his own, sufficiently mild to produce a beneficial influence on his health. Besides this, his opportunities of taking exercise in the open air will be much more frequent, and being exposed to a degree of cold less severe and of shorter continuance, he will avoid a constantly recurring cause of relapse.

But it must be kept in mind, as has been before observed, that there are other circumstances connected with the adaptation of climate to disease which require attention, as well as temperature. The particular nature of the disease and of the patient's constitution, and the character of the climate most suitable for these, will naturally be the first object of the physician's consideration; but the nature of the climate in which the invalid has lived, ought also to be taken into account. This last circumstance, namely, the comparative influence of any particular climate on different individuals, depending on the nature of that which they previously inhabited, has not, I believe, been sufficiently attended to: it de-

[1] The influence of relative temperature on organic life might be aptly illustrated by a reference to its very remarkable effects on plants; and the influence of warmth, whether natural or artificial, in exciting or accelerating the vegetation of these, affords matter of reflection to the physician in estimating the effects of climate on man. It is, I believe, a general practice with gardeners in respect to plants, which they wish to force rapidly in the hot house, to keep them previously in as cold a temperature as they will bear. And it has been often proved, that a vine, accustomed to the temperature of the open air, will vegetate in winter, if transferred to the hot house, while a plant from the same stock, accustomed to the stove, will remain without any sign of budding. See Mr. Knight's Observations on the Method of Producing New and Early Fruit.—*Transactions of the Horticultural Society of London*, vol. i.

serves, however, the especial consideration of physicians when selecting a climate for their patients.

With respect to the merits of the milder parts of England in their influence on disease, I have already made a few remarks while treating of particular places. As regards consumptive invalids, for whom climate has been looked to as the great resource, I beg to refer the reader to the article on consumption.

There is no one of the English climates, as far, at least, as our present knowledge of them extends, so much superior to the others, as to give it a claim to a decided preference in consumptive diseases. The selection must, therefore, depend upon the nature of the individual's constitution, and the character of disease. In cases in which a soft and rather humid air is known to agree, the coast deserves the preference; and at the more sheltered parts of the coast of Devon, as Torquay, and at Penzance, the generality of patients labouring under confirmed pulmonary disease, will find an air more soothing to the respiratory organs than at any other place frequented by invalids in our island. For invalids labouring under a relaxed state of the bronchial membrane, or of the system generally, or where a strong disposition to hæmoptysis has shown itself, the drier and more bracing air of Clifton will agree better; and Undercliff will prove a still more favourable residence. The climate of Hastings may be considered as somewhat intermediate between that of Devonshire and Clifton; less warm, but also less relaxing than the former, it is about the same temperature, but less dry and bracing than the latter, and it is inferior to it as a spring climate. The air of Hastings, as has been already remarked, is also more essentially a sea-air than that of any of these places; a circumstance which will have its due weight with the physician, when deciding upon a climate for his patient.[1]

On the other diseases of the chest, climate exerts a very beneficial influence. In the chronic inflammatory affections of the throat, trachea and bronchi, of the dry, irritable kind, or accompanied with little secretion or expectoration, the coast of Devonshire affords a very favourable climate; likewise in dysmennorhœa, and in dry irritable cutaneous diseases. In diseases of the bronchial membrane, on the other hand, which are attended with copious expectoration, or when there is a greatly relaxed state of the mucous membrane of the chest, with atonic dyspepsia, the climate of the southwest of England is unfavourable; as it is in uterine disorders attended with copious discharges; in menorrhagia, and in all diseases accompanied with a relaxed state of the system generally. It is difficult to find any place in our island well suited during the whole of the cold season, to that numerous class of bronchial diseases, where there is a greatly relaxed state of the mucous membranes, and yet a constant disposition to a more active degree of inflammatory disease. Undercliff will be found one of the best

[1] See article on consumption.

climates for such patients, and Clifton also is a good climate. Brighton is a very favourable residence during the autumn and part of the winter, but after the month of February it is equally unfavourable. Persons labouring under bronchial disease in its less severe forms, who cannot absent themselves from London during the whole season, might pass the autumn at Brighton, remain in town during the winter, and go to Undercliff or Clifton for the spring months; or should this be inconvenient, Chelsea, Brompton, and Kensington, afford sheltered spring situations.

In the disordered states of the digestive organs, which not unfrequently lead to consumption, and in broken down constitutions, the genial influence of a mild climate is one of the most powerful means of relief which we possess. In those cases in which, from a long deranged state of stomach, a sympathetic irritation has been excited in the bronchial membrane, and the person is liable to attacks of catarrh every spring, or is subject to habitual cough, greatly aggravated during that season, such a change is peculiarly beneficial. No class of invalids is, indeed, more susceptible of cold, or suffer more from it than dyspeptics, more especially nervous dyspeptics. But a low degree of temperature is not the only condition of the atmosphere which disagrees with persons suffering from stomach complaints. There are other circumstances in the nature of a climate, cognizable rather by their effects, than by the appreciable physical qualities of the air, which exert a powerful influence on their sensitive constitutions. Different forms of this disease also derive benefit from climates of a different character. With persons labouring under gastritic dyspepsia, the climate of Devonshire will agree, while it will decidedly disagree with those suffering from the atonic form of the disease.[1] In proportion, therefore, as the one or other of these conditions predominates, will this climate prove beneficial or the reverse; but I should scarcely consider a long residence in it advisable in any form of dyspepsia. Persons who have lived in a drier and more bracing air become, after a short residence on this coast, very sensible of the enervating and debilitating influence of the climate on their digestive organs. They feel a sense of distention or oppression in the region of the stomach, with a torpor of the whole system, after meals, indicative of laborious digestion. In the nervous forms of dyspepsia, Clifton will prove a much more favourable residence than any part of Devonshire. Brighton, during the autumn and greater part of the winter, agrees admirably with this class of dyspeptics in general.

Other situations are, no doubt, to be found in our island, besides those which I have noticed, capable of affording a favourable retreat to the invalid during our inclement season; but I have thought it necessary to notice those places only, with the climates of which we are best acquainted.

It is probable, that some may find my distinciions of climate too

[1] See article on disorders of the digestive organs.

minute and particular, and my directions not sufficiently positive and absolute. To such I beg to observe, that I have drawn no distinctions for which I have not data; and that one of the principal objects of the second part of this work is to call the attention of the profession to these distinctions, the importance of which, in a remedial point of view, is far greater than is generally believed. Where my experience has allowed, I have pointed out the use and application of these distinctions; but when this has not been the case, I have preferred to leave the application of them to future and more extensive observation; lest, by going beyond what my premises justify, I might, by a false conclusion, destroy the value and importance of what I know to be true.

Summer Residences.—After this survey of the best winter climates in England, it may be expected that we should take some notice of our more salubrious summer residences. On this subject, however, it is not necessary to go into detail, as there is no lack of healthy situations to which our invalids may repair with advantage during this season. In the selection of a summer, as of a winter residence, the same circumstances require attention, both as regards the character of the climate and the nature of the invalid's disease. Even during this season, the milder and more sheltered situations must be chosen for delicate and very sensitive invalids; while for the relaxed and enervated, and those possessing less sensibility, the bracing air of the higher and drier districts will prove more suitable. To a large class of invalids our sea-side watering places offer a variety of excellent situations; and for those cases in which sea-bathing is proper, they deserve a preference over the interior, especially during the latter part of the summer and autumn. Several of our inland watering places, independently of the advantages to be obtained, in many cases, from the use of their mineral waters, afford good summer climates; and, indeed, some of them, more on this account than any other, have become places of fashionable resort. Among these we may mention Malvern, Cheltenham, Leamington, Tunbridge Wells, Matlock, &c. In general it will be advantageous to invalids who have resided during the summer at any of those places, to pass the autumn by the sea-side, as at some of the driest places on the south, or south-east coast. In the greater number of cases in which traveling is borne without inconvenience, several changes, or a succession of short journeys, will be more beneficial to most invalids than a residence during the whole season in any one place. It is remarkable how such repeated changes, with frequent gentle exercise, especially on horseback, renovate the constitution enfeebled by disease, enable it to overcome many chronic affections, and contribute to the restoration of permanent health. But we shall have occasion to recur to this subject.

THE CHANNEL ISLANDS.

These islands are occasionally resorted to by invalids from this country, and, when the cases are properly selected, often with advantage.

Jersey is the largest of the Channel Islands, and that most frequented by invalids. It stretches from east to west, and averages nine miles in length, by five in breadth. From the north coast, which is steep and craggy, the island slopes to the south. It consists almost entirely of hill and dale, and abounds in wood and verdure. The ground is thickly hedged, and the pathways are bordered by double files of trees, planted on high embankments, interrupting the view from the highest carriage. The general character of the soil of Jersey is a deep, sandy loam, with a subsoil of red loam or clay, based on granite rock, or schistose formations. Generally speaking, the water of the higher situations is *soft ;* of the lower, *hard.*

The following table, from Dr. Hooper's work,[1] shows the distribution of temperature throughout the year.

TABLE,

Showing the mean temperature of the months, seasons, and whole year; averaged on the years 1831–32–33–34 *and* 35.

March,	45.75	Spring,	50.97	53.06
April,	50.09			
May,	57.08			
June,	61.31	Summer,	62.84	
July,	63.50			
August,	63.72			
September,	59.82	Autumn,	54.63	
October,	55.65			
November,	48.42			
December,	45.27	Winter,	43.82	
January,	41.58			
February,	44.62			

From its small size, and from its situation in the current of the channel, Jersey is freely exposed to all winds. High winds are very prevalent. A perfectly calm day, even in summer, is rare; and, generally speaking, says Dr. Scholefield, even the finest weather may be called "blowy."[2] The western breezes, according to Dr. Hooper, occupy two thirds of the year. The northeast wind often reigns continuously for a considerable time, particularly in

[1] Observations on the Topography, Climate, and Prevalent Diseases of the Island of Jersey. By George S. Hooper, M. D., London, 1837.

[2] Inglis's Account of the Channel Islands. Appendix by Dr. Scholefield.

the spring months, and then it is severely felt by the delicate invalid.

The actual fall of rain in Jersey does not appear to have been measured. Dr. Hooper states, that the number of rainy days falls short of that of the south and southwestern coasts of England; but he is inclined to think, that if the quantity of rain was estimated by a rain gauge, it would be found greater at Jersey, as the showers there are generally copious and of long duration. In addition to the quantity of rain which falls, the thickly wooded state of the island, and the imperfect drainage, contribute to the extreme humidity of Jersey.

"It may be said," observes Dr. Hooper, "that the island of Jersey enjoys an early spring and a protracted autumn; vegetation being usually active and forward in March, and the landscape of the country far from naked so late as the end of December. The dreary aspect of winter, therefore, is short lived. With rare exceptions, the latter season passes off in soft or windy weather, with intervals of astonishingly mild days, and with scarcely any frost or snow. The prevailing winds of this season are the west and southwest, and the actual temperature, its variations and ranges, are all in favour of the island, compared with other places in neighbouring latitudes. The season of spring is of course marked by the same unsteadiness of temperature and harsh variations of weather, as in most places under a similar latitude; and this disadvantage is particularly felt in May, which often fails to bring with it the expected enjoyments. The month of March, on the contrary, is comparatively mild, and so is October." Dr. Hooper farther remarks, (p. 71,) that the general qualities of the climate of Jersey may be made available to the invalid, to whose case they are applicable, during a period of six months in the year.

St. Helier's, the capital of Jersey, Dr. Scholefield says, is not favourably situated for exercise, and is peculiarly subject to rain and fogs. The most healthy situations in Jersey, according to Mr. Murray, are on the southwest side of St. Helier's parish. The eastern side is also healthy; and St. Aubin's, about three miles to the west of St. Helier's, is considered one of the best situations for invalids.

The most prevalent disease in the Channel Islands is chronic rheumatism, which among the people of the rural districts is universal after the age of thirty; dyspepsia, diseases of the liver, and dropsy are also prevalent. Scrofula is common, particularly among the Jewish part of the population. Intermittent and remittent fevers are frequent; and diseases of the skin very much so. Phthisis is said not to be frequent, but no accurate statistical account is given. Calculous diseases are rare; inflammatory diseases are not of acute character, and the natives do not bear bleeding well.

The climate of the Channel Islands has a close resemblance to that of the southwest coast of England, and especially to Penzance. There are the same equable temperature, the same soft humid

atmosphere, and the same liability to high winds during the winter, and cold northeast winds in the spring, which characterise the latter place. So close is the affinity of their climates, and so similar their influence on disease, that the remarks which have been made on the southwest of Devonshire, and the Land's End, as residences for invalids, are perfectly applicable to the Channel Islands.[1]

CLIMATE OF FRANCE.

The south of France has long been held in estimation for the mildness of its winter climate, and various parts of it have been and are still resorted to by invalids. The southern provinces, as regards climate, admit of being classed under two divisions, namely, the *southeastern* and the *southwestern ;* differing essentially from each other in the physical characters of their climate, and the influence of this on disease.

SOUTHWEST OF FRANCE.

The climate of the southwestern provinces of France resembles in its general qualities that of the southwest of England ; the mean annual temperature being about 4° higher. The climate may be characterised as soft, relaxing, and rather humid.

Laennec found the southern coast of Brittany favourable to consumptive patients ; and he also observed that the proportion of consumptive diseases in this part of France, was comparatively small. Generally speaking, the climate of the southwest of France will be found useful in chronic inflammatory affections of the mucous membranes accompanied with little secretion, as in chronic bronchitis not attended by much expectoration, or difficulty of breathing, and in similar morbid states of the larynx and trachea. It will be equally proper in dry scaly eruptions of the skin ; in dysmenorrhœa ; in certain kinds of headach, especially those induced or exasperated by sharp northeast winds ; and in high morbid sensibility in general, when accompanied with that habit of body which the ancients called *strictum.* On the other hand, the same diseases occurring in relaxed habits, in which there is a disposition to copious secretion, will be aggravated by this climate.

PAU.

Pau, the capital of the Department of the Lower Pyrenees, and the only place in this district of which I consider it necessary to

[1] For fuller and more particular information regarding Jersey, Dr. Hooper's work, already referred to, may be advantageously consulted.

give a particular account, is finely situated upon a ridge of gravelly hills, overlooking an extensive valley to the north. The Pyrenees rise gradually behind it, their higher range being nearly forty miles distant. Pau is about 150 miles from Bourdeaux, and 50 from Bayonne. Having made but a short visit to this place myself, I am principally indebted for the following account of it to the kindness of Dr. Playfair, (now of Florence,) who resided there for several years.

Although the character of the climate of Pau corresponds with that of the southwest of France generally, it possesses some peculiarities which it owes to its topographical situation. Notwithstanding its distance from the coast, it is very much under the influence of the Atlantic. All the changes to which this gives rise extend as far as Pau, though modified, in some degree, by distance, and still more, by the position of the place with respect to the neighbouring mountains. Calmness, for example, is a striking character of the climate, high winds being of rare occurrence and of short duration.

The mean annual temperature of Pau is 4½° higher than that of London, and about 3° higher than that of Penzance; it is about 5° lower than that of Marseilles, Nice, and Rome, and 10° lower than that of Madeira. In *winter*, it is 2° warmer than London, 3° colder than Penzance, 6° colder than Nice and Rome, and 18° colder than Madeira. But in the *spring*, Pau is 6° warmer than London, and 5° warmer than Penzance; only 2½° colder than Marseilles and Rome, and 7° colder than Madeira. The range of temperature between the warmest and coldest months at Pau is 32°; this at London, and likewise at Rome, is 26°; at Penzance it is only 18°, and at Madeira 14°. The daily range of temperature at Pau is 7½; at Penzance it is 6½°; at Nice, 8½°; at Rome, 11°.

The annual quantity of rain has not been measured at Pau. The number of days in which rain falls is 109; nearly the same as at Rome, and about seventy less than at London. The west wind blowing directly from the Atlantic, is accompanied with rain; the wind from the northwest, and from this point to the northeast, brings dry, cold weather; while that from the northeast to the south, is usually attended by clear, mild weather. The south, and southwest winds, are warm and oppressive. The westerly, or Atlantic winds, are the most prevalent; the north wind blows feebly, and is not frequent; the oppressive southerly winds are of rare occurrence, and seldom continue beyond twenty-four hours. Indeed, Pau appears to be almost exempt from the oppressive southerly winds on the one hand, and the cold northwest winds on the other; both of which prevail over this part of France generally. The easterly winds are next in frequency to the west, with which they usually alternate, and it is observed that, according as the one or other wind prevails, the weather is rainy, or dry and pleasant.

Though from the more frequent occurrence of westerly winds, this climate may be said to be rainy, still it is not subject to some

of the evils which commonly attend humid climates; or, at least, it suffers from them in a less degree than these generally do. Rain seldom continues above two days at a time, and is usually followed in a few hours by warm sunshine; while the ground, from the absorbing nature of the soil, dries rapidly. The atmosphere, generally speaking, is also remarkably free from moisture, as indicated by the hygrometer. In October, some snow generally falls on the centre chain of the Pyrenees; and, at Pau, this fall is marked by a sudden change of temperature, the weather becoming rainy and chilly. In November, the weather clears up, and becomes milder. December and January are cold and dry; frost and slight snow showers then occur, but the snow does not lie on the ground. The sun is bright and warm; and from twelve till three o'clock, an invalid may generally take exercise. February is milder; but, towards the end of this month the spring rains fall, and the weather is then chilly and disagreeable. March is mild, but variable; though there are no cutting winds. In spring, westerly winds, which are soft and mild, accompanied with rain, alternate with dry easterly winds, also of a mild character. Hence it is, that the vernal exacerbation of inflammatory affections of the stomach and lungs, so commonly observed in other climates, is little felt by invalids at Pau. Vegetation bursts forth in the first week of April, which is a warm month. May resembles April, but is warmer. In June the weather is hot and fine. July, August, and September, are very hot months, the thermometer sometimes rising as high as 94° in the shade; with a very powerful sun, preventing exercise from eight in the morning till seven in the evening.

According to Dr. Playfair, the good qualities of the winter climate of Pau may be summed up as follows:—Calmness, moderate cold, bright sunshine of considerable power, a dry state of atmosphere and of the soil, and rains of short duration. Against these must be placed—changeableness, the fine weather being as short lived as the bad; rapid variations of temperature, within moderate limits. In autumn and spring there are heavy rains.

Pau is upon the whole healthy. Intermittent and bilious fevers, and rheumatism, are the most prevalent diseases. Rheumatism, according to a native author, is the only disease that is very common; it exists almost as an endemic, and simulates or complicates almost all the other diseases.[1] Goitre is also very common among the peasantry. The intermittent fevers occur chiefly among the peasants who frequent the low damp grounds in the neighbourhood.

There are several circumstances in the climate of Pau which render it a favourable residence for a certain class of invalids. The atmosphere, when it does not rain, is dry, and the weather fine, and there are neither fogs nor cold piercing winds. The characteristic quality of the climate, however, is the comparative mildness of its spring, and exemption from cold winds. While the

[1] Journal de Physiologie, tom. vii. p. 303.

winter is 3° colder than the warmest parts of England, and 6° colder than Rome, the *spring* is 5½° warmer than the former, and only 2½° colder than the latter. The mildness of the spring, and its little liability to winds, render this place favourable in chronic affections of the larynx, trachea, and bronchi. In gastritic dyspepsia Dr. Playfair has found it beneficial, and he has seen it useful in a few cases of asthma. With delicate children, also, he found the climate agree well, especially when they removed to the mountains during the summer.

Upon the whole, Pau appears to be the most desirable winter residence in the southwest of France, for invalids labouring under chronic affections of the mucous membranes. In the same class of diseases, the mineral waters of the Pyrenees are also very beneficial; and it may be convenient, and advisable, for the invalid, who has derived benefit from a course of these waters, to pass the winter at Pau, with a view of returning to them in the following season.

Invalids labouring under, or subject to attacks of rheumatism, should, of course, avoid Pau. In bronchial diseases, also, when accompanied with much general relaxation of the system, and with copious expectoration and dyspnœa, the climate will not in general prove beneficial; and Dr. Playfair considers it too changeable in consumptive diseases.

Dr. Foville, who passed two years at Pau, for the benefit of his own health, considers the above account of its climate correct in the main, but in some respects too favourable. Its greatest advantage is the constant calmness of the air. He thinks the climate uncongenial to persons with delicate chests. The inhabitants, he says, are generally healthy, and the mortality less than in most cities of France.

Invalids, who mean to pass the winter at Pau, should arrive there in the end of September, or very early in October.

In fixing the period for leaving Pau, the destination of the person must be taken into account. If the object is to return to England, he may leave it in May; if he means to spend the summer among the Pyrenees, he should not leave it before June. The best season for using the mineral waters of the Pyrenees commences about the first of July.

SOUTHEAST OF FRANCE.

Various places in the *southeast* of France have been, at different times recommended as affording a good winter climate for consumptive patients; but nothing can be more unaccountable than how such an advice ever came to be given; as the experience of later years is in complete opposition to it, and the general and leading characters of the climate show, that there never was the least reason to sanction it. How the practice of sending consumptive invalids to the southeast of France originated, it is not of importance to inquire; but that it is founded on error, I think I shall be able

to prove, by a reference to the total want of success which has attended it, as well as to the physical characters of the climate.

The mean annual temperature of Provence generally, is 58°: that is, about 7° warmer than the southwest of England, 3° warmer than the southwest of France, and about a degree below Italy, including the climate of the lower Apennines. Its *winter* temperature is 43°; being only 1½° above the southwest of England, and 1° above the southwest of France, while it is 3° under Italy. The *spring* temperature is 55°; namely, 6° above the southwest of England, 1° above the southwest of France, and 2° below Italy. The temperature is distributed very unequally through the year; the difference of the mean of the warmest and the coldest months being 35°; this in the southwest of England is 22°, in the southwest of France 30°, in Italy 32°, and in Madeira only 14°.

Dryness is one of the most remarkable characters of the climate of Provence. At Marseilles and Toulon, about nineteen inches of rain fall annually. This is less by six inches than what falls at London, and is not half so much as falls in the southwestern extremity of Cornwall. The annual number of days on which rain falls in Provence, is only sixty-seven, while at London it is 178. Again, in Provence (at Toulon) the quantity of water evaporated annually, is forty inches, while at Paris it is thirty-two inches, at Gosport twenty-five, and at London only twenty-four. When these circumstances are taken into consideration, together with the high mean temperature, the climate of Provence appears the driest in Europe. Indeed, the dry nature of the soil, and the bare parched aspect of the country, bespeak this.

The general character of the climate of the southeast of France is thus dry, hot, and irritating. Its temperature throughout the year and the day is distributed with great irregularity, and the range is much wider than in our own climate; being, as three to one for the year, and as two to one for the day. The temperature, no doubt, remains more steady from day to day, than our own; but its changes, though less frequent, are more sudden and extensive. Sometimes the winter is very rigorous. The orange trees are occasionally killed by the cold in the most sheltered parts of Provence. In 1709 the ports of Marseilles and Toulon were frozen over.

This tract of country is subject also to keen, cold, northerly winds, especially the *mistral*, which prevails during the winter and spring, and is most injurious in pulmonary diseases.

Although decidedly improper for consumptive patients, and for those labouring under irritation of the mucous membranes of the stomach, larynx, or trachea, this climate may prove useful to invalids of a different class. On persons of a torpid, or relaxed habit of body, and of a gloomy, desponding cast of mind, with whom a moist relaxing atmosphere disagrees, the keen, bracing, dry air of Provence, and its brilliant skies, will often produce a beneficial

effect. In some cases of chronic intermittent fevers, also, it proves very favourable.

The distinctive characters of the climate prevail more or less in the different places resorted to by invalids, but none can be considered as exempt from them. The remarks which I have to make on these places individually, are derived partly from native practitioners, and partly from my own observation; and it will be found, I think, that the particular facts confirm the general character given of the whole southeast of France, from Montpelier to Nice.

MONTPELIER.

The celebrity of the medical school at Montpelier, had probably a considerable share in giving rise to the character which this place obtained for the benignity of its climate—*olim Cous nunc Monspeliensis.* But whatever may have been the merits of its medical school, it will be easy to show, that the climate little deserved the reputation which it long enjoyed as a residence for the consumptive. I prefer the evidence afforded on this subject by native authors. M. Murat, in his Medical Topography of Montpelier, published in 1810, states on the authority of M. Fournier, the following proportion of deaths from consumption, at the Hotel Dieu, of that city, in the year 1763. The total number of patients that passed through this hospital in the course of the year was 2,756. The total number of deaths was 154; and of this number fifty-five died of pulmonary consumption; that is, more than a third of the whole. After alluding to M. Fouquier's opinion, that phthisis was still more frequent at a former period, he adds, "Mais la phthisie pulmonaire n'est que trop répandue dans ce pays: elle y enlève même des familles entières; et la position de la ville, et la constitution sèche et variable des saisons physiques, sont des causes locales qui la développeront toujours."[1] M. Fournier, the author from whom the above numbers are taken, observes, when noticing the prevalence of northerly winds at Montpelier, during the winter and spring, "Il faunt avoir la poitrine bien bonne et bien constituée pour résister à ses impressions."[2] Other circumstances in the topography and nature of the climate of Montpelier might be stated to show its unfitness as a residence for consumptive patients, but surely it is unnecessary to adduce further evidence on the subject. Consumptive patients are frequently sent from this place to the village of Gauche, at the foot of Cevennes, about two leagues distant.

MARSEILLES.

This place is but little intitled to claim any exemption from the general character of the climate of Provence. It is open to the full

[1] Topographie Médicale de la Ville de Montpelier, p. 149.

[2] Recueil d'Observations de Médecine des Hôpitaux Militaires, par M. Richard de Hautsierck, tom. ii. p. 5.

influence of the cold winds of this country, and especially to the mistral. There is, moreover, no part of the neighbourhood of Marseilles, where invalids can take exercise, when the weather does permit them to go out; one of the principal objects for which they left their own climate. The country around the city is divided into small properties, each enclosed by high walls, between which the roads in every direction lead for miles. The dry, arid nature of the soil, renders these roads in general very dusty, and the narrow winding form, subjects them to gusts of wind; both of which circumstances makes them most improper exercising ground for invalids labouring under pulmonary irritation. Indeed, it may be almost said, that there is no country about Marseilles, at least for the stranger residing there. But the character of the climate is still more objectionable. It is dry, variable, and subject to cold irritating winds, which are particularly injurious to consumptive patients. Marseilles is indeed, one of the towns in France in which pulmonary consumption is most prevalent. A large proportion of the youth of both sexes is carried off by it. Females, from fourteen to eighteen years of age, are said to be its most frequent victims. To use the words of a native author: "Il fait des ravages inouiés en moissonnant la plus belle jeunesse."[1] Scrofula attacking the external parts of the body is rather a rare occurrence at Marseilles. Pleurisy and catarrh are frequent; as are cancer and cutaneous eruptions. Diseases of the uterine system are also common.

Invalids requiring a dry climate, and capable of bearing keen, cold winds, will be benefited by a residence at Marseilles: patients labouring under intermittent fevers often get rid of them on coming to this place.

HYERES.

The little town of Hyères, agreeably situated on the southern declivity of a hill, about two miles from the shores of the Mediterranean, and twelve from Toulon, is the least exceptionable residence in Provence for the pulmonary invalid. It is in some degree protected from the northerly winds, and has the advantage of being situated in a beautiful, open country. Immediately under the town, the orange tree is cultivated in abundance. It is the hardiest species, and thrives very well in general, being little injured by the winter. It has, nevertheless, happened several times, although after an interval of many years, that the cold has been sufficiently intense to destroy the whole of the orange trees at Hyères in one night. This occurred last in the winter of 1820, on which occasion not a single orange tree escaped; and many of the olive trees, in the most exposed situations, were also partially killed.

The lower grounds are occupied with vines and corn, and about

[1] Exposé des Travaux de la Société de Medecine de Marseilles, 1816, par M. Sigaud, p. 14.

the bases of the hills the olive is extensively cultivated, and attains a considerable size. The hills immediately surrounding Hyères are finely covered with evergreen shrubs, affording a striking contrast to the bare, unseemly aspect, which the hills of Provence generally present. The thyme, rosemary, lavender, and many other aromatic plants grow here in abundance; and several of these we find blooming in December. With all these indications of mildness, Hyères is by no means sufficiently protected from the mistral to render it a desirable residence for consumptive invalids, (setting aside objections from the nature of the climate,) although it has been strongly recommended as such. It is true that about the base of the hills there are some spots sheltered from the mistral, where the invalid might enjoy several hours in the open air almost every day; but these are almost unattainable when they would be most useful. The chilly blast sweeping round every exposed corner, forbids the valetudinarian venturing there, except in a close carriage, while the roads leading to these places do not admit wheeled vehicles. When the weather does permit, the invalid residing at Hyères may enjoy the advantage of a variety of rides through a fine open country. But when the mistral blows with any degree of force, he should confine himself to the house, if his chest be delicate; and he must even be cautious at all times of exposing himself to this wind, which, independently of its low temperature, is very irritating. With all these objections, the climate of Hyères is the mildest in Provence; and the invalid may feel assured, that whatever inconveniences he is subjected to from the cold winds at this place, he would have experienced in a greater degree at any other part of the southeastern district.

NICE.

The climate of Nice approximates more nearly in its general characters to that of Provence, which has just been described, than to any other. Its mean annual temperature is 59°, being 9° warmer than London, 7° warmer than Penzance, 1° colder than Rome, and 5° colder than Madeira. The mean temperature of *winter* is 48°; that is, nearly 9° warmer than London, 4° warmer than Penzance, 1° colder than Rome, and 12° colder than Madeira. The mean temperature of *spring* is 56°; being 7° warmer than London, 6° warmer than Penzance, 1° colder than Rome, and 6° colder than Madeira. The temperature throughout the year is more equally distributed at Nice than at any place in the South of Europe, of which we have accounts, except Rome and Cadiz; the difference of the warmest and coldest months being only 28°, and the mean difference of successive months only 4°.74.

The range of temperature for the day is also less at Nice than at any other part of the south of Europe; and in steadiness of temperature it ranks next to Madeira.

The mild and equable character of the climate of Nice depends

in a great measure on the position of the place with respect to the neighbouring mountains and the sea. The maritime Alps form a lofty barrier, which shelters it from the northerly winds during winter; and the cool sea breeze, which prevails every day, with a regularity almost equal to that of a tropical climate, moderates the summer heat. "Cet alizé Méditerranean," says M. Risso, "toujours doux, frais et tranquille, s'eleve periodiquement vers neuf à dix heures du matin, cesse souvent vers les quatre heures après midi, et s'étend dans l'intérieur de nos Alpes rarement au delà de huit myriamétres."[1] These circumstances explain the small annual range of temperature at this place, already noticed, and which a reference to the table in the Appendix will show to be much less than at most parts of Italy.

Notwithstanding the extent, however, to which Nice and its environs are encircled by mountains, (and it is so in a great measure from W. S. W. to E. S. E.,) it is by no means exempt from cold winds during the winter, and still less so during the spring. The easterly winds are the most prevalent during the latter season. They range from east to northeast, frequently blow with considerable force, and are often accompanied with a hazy, cloudy, state of atmosphere. Sometimes this wind sets in towards the forenoon, at other times not until the afternoon. When the early part of the day is fine, it never should be lost for exercise; as the afternoon frequently proves cold and windy, after a calm mild morning.

From the northwest or mistral, which is the scourge of Provence, Nice is pretty well sheltered. The force of this wind seems to be broken, and directed to the southward by the Estrelles, a chain of mountains between Frejus and Cannes. Although the mistral is never experienced in its full power at Nice, or only at least towards its termination, when it takes a more westerly direction, (*la queue de la Mistral*, as it is called,) the keen, dry quality of the air is very sensibly felt whilst it prevails. It sets in generally about two or three o'clock in the afternoon, and is not of long duration. The wind seldom blows strong directly from the north, though the air is very sharp when it is in that quarter. The northerly gales appear to pass obliquely over Nice.[2] The sirocco is of rare occurrence,

[1] Histoire Naturelle de Principales Productions de l'Europe Meridionale, et particulierement de celles des Environs de Nice. 1825, par A. Risso. Vol. i. p. 219. To this excellent work I beg leave to refer my readers who may be desirous of information respecting the Natural History of the south of Europe.

[1] "On éprouve fort rarement," says M. Risso, "toute sa force dans les couches inférieures de l'air qui environnent le plateau de Nice, à cause du triple rang de montagnes qui l'entourent; il occupe presque toujours les couches supérieurs, et descend en pente comme un grand torrent aérien sur la mer; car on aperçoit a un kilomètre du rivage qu'il commence à en friser la surface pour former un peu plus loin des vagues qui, s'elévant les unes sur les autres, vont porter les tempêtes sur les côtes boreales d'Afrique."—*Hist. Nat.* vol. i. p. 216.

and when it does pay a visit, it is gentle, and not unpleasant to the feelings of invalids in general.

The weather at Nice during the winter is comparatively settled and fine, the atmosphere being generally clear, and the sky remarkable for its brilliancy. The temperature seldom sinks to the freezing point, and when it does, it is only during the night; so that vegetation is never altogether suspended. Indeed, at Nice, winter is a season of flowers, the dryness of the air rendering the same degree of cold less injurious to them, than it would be in a more humid atmosphere. Spring is the most unfavourable season; the sharp, chilling, easterly winds are the greatest enemy with which the invalid has to contend; and the prevalence of these during the months of March and April is admitted, I believe, by all who have felt them, to form the greatest objection to this climate, especially in pulmonary diseases.

The climate of Nice is altogether a very dry one. Rain falls chiefly during particular seasons. From the middle of October to the middle of November it generally rains a good deal; also about the winter solstice there is commonly some rain, and again, after the vernal equinox. The quantity of rain that falls during the year has not been accurately estimated.

Upon the whole, in the physical qualities of its climate, Nice possesses some advantages over the neighbouring countries of Provence and Italy, inasmuch as it may be said to be free from the sirocco of the latter, and protected from the mistral of the former.

Nice is upon the whole a healthy place. Catarrhal affections and inflammation of the lungs rank among the most frequent diseases. The latter is especially common and violent in the spring, and is generally complicated with irritation of the digestive organs. Pulmonary consumption is much less frequent in England and France. Gastric fever and chronic gastritis are very common diseases. Indeed, gastric irritation appears to be very prevalent; and almost all other diseases are complicated with more or less of it. Intermittent fevers are not unfrequent among the peasantry living or labouring in unhealthy situations in the country. The flat ground on the banks of the Var is the most fruitful source of these fevers. The guards stationed on the bridge which crosses this boundary stream, are frequently attacked with ague, during the unhealthy season, though they remain there only a few days at a time. This is a disease, however, from which the winter resident at Nice has nothing to fear. Dr. Skirving, during a long residence there, met with one case only of ague amongst the strangers. Diseases of the eyes are very prevalent, particularly amaurosis and cataract; cutaneous diseases are also very common. The elephantiasis of the Greeks is occasionally observed in certain warm spots in the neighbourhood. It is also found sometimes in the vicinity of Marseilles, and, I believe, along the whole of this coast. It is less common in Italy, except perhaps at Naples.

In proceeding to describe the effects of the climate of Nice on

disease, I feel it due to Dr. Skirving, who practised there many years, to state, that I am much indebted to him for favouring me with the results of his extensive experience.

In *consumption*, the disease with which the climate of Nice has been chiefly associated in the minds of medical men in this country, little benefit I fear is to be expected from it. When this disease is complicated with an irritable state of the mucous membranes of the larynx, trachea, or bronchi, or of the stomach, the climate is decidedly unfavourable; and, without extreme care on the part of the patient, and a very strict regimen, the complaint will in all probability be aggravated by a residence at Nice. Indeed, the cases of consumption which ought to be sent to this place are of rare occurrence. If there are any such, it is when the disease exists in torpid habits, of little susceptibility, and is free from the complications which have been just mentioned. Even the propriety of selecting Nice as a residence for persons merely threatened with consumption, will depend much upon the constitution of the individual. Dr. Skirving has met with cases which leave no doubt on his mind, that a residence for one or two winters often proves of advantage, as a preventive measure, in young persons predisposed to this disease; and even in some instances when there was every reason to believe that tubercles already existed in the lungs, the climate has appeared to be useful. But in the advanced stage of consumption, his opinion, founded on eight years' experience, accords with what has been already stated; and this is still further supported by the testimony of Professor Foderé, of Strasbourg, who resided six years at Nice.[1] Indeed, sending patients, labouring under confirmed consumption, to Nice, will, in a great majority of cases, prove more injurious than beneficial.

In *chronic bronchitis*, which often simulates phthisis, very salutary effects are produced by a residence at this place. Such patients generally pass the winter with comparatively little suffering from their complaint, and with benefit to their general health. They are here able to be much in the open air, whereas, if they had remained in England, they would in all probability have been confined during the greater part of the winter to the house. The particular kind of bronchial disease most benefited by a residence at Nice, is that which is accompanied with copious expectoration, whether complicated with asthma, or otherwise; and in the chronic catarrh of aged people it is particularly beneficial. This variety of bronchial disease is directly the reverse of that which is mitigated by the southwest of France and of England: and I think it important here to remark, that unless the distinctions which I have pointed out in bronchial diseases, and their complications, are attended to, great errors must be committed in selecting a residence

[1] See Voyage aux Alpes Maritimes, ou Histoire Naturelle, Agraire, Civile et Medicale du pays de Nice, &c. Strasbourg, 1823.

for such patients. For fuller information on this subject, the reader is referred to the article on "bronchial diseases."

The *gouty* invalid may, in most cases, escape his usual winter attack; and, provided he lives with prudence, his general health may be improved by a winter's residence at Nice.

In *chronic rheumatism*, the climate is generally very beneficial; and its advantages are also remarkable in *scrofulous complaints*. On children the climate generally exerts a very favourable influence, if attention be paid to their diet.

In the numerous train of hypochondriacal and nervous symptoms which often originate in dyspeptic complaints, Nice is beneficial; but here, again, it is necessary to distinguish the particular character of the affection. The cases of dyspepsia most benefited are those accompanied with a torpid, relaxed state of the system, with little epigastric tenderness, or any of those symptoms which denote an inflamed or very irritable state of the mucous membrane of the stomach. Where the latter state prevails, Nice will decidedly disagree. But I must refer to the article on "disorders of the digestive organs" for more precise directions regarding the best winter residence for persons suffering from stomach complaints.

In all cases where there is great relaxation and torpor of the constitution, the climate of Nice is extremely useful. In young females labouring under such a state of system, connected with irregularities of the uterine functions, either when these have not been established at the usual period, or when they have afterwards been suppressed, marked benefit may generally be expected. In indicating the class of cases alluded to, as likely to derive advantage from the climate of Nice, I would designate them to the practical physician as those that are usually relieved by chalybeates.

In a numerous class of patients, whose constitutions have been injured by a long residence in tropical countries, by mercury, &c., and in which a dry and rather exciting climate is indicated, Nice will prove favourable. Some cases of chronic paralysis, not connected with cerebral disease, have also been found to derive considerable benefit from a residence at this place.

In stating its general influence on the animal economy, I would say—that the climate of Nice is warm, exhilarating, and exciting, but upon the whole, irritating—more especially during the spring—at least to highly sensitive constitutions. It is extremely favourable to the productions of the vegetable kingdom, some of which flourish here in a degree of luxuriance that is scarcely to be equaled in the other parts of the south of Europe.[1]

[1] "Peu de contrées méridionales de l'Europe offrent un tableau aussi varié en vegetaux indigènes et exotiques que les environs de Nice. Dans le fond, c'est une masse d'oliviers qui s'étend sur toutes les collines, et dispairaît insensiblement à mesure qu'elle s'eloigne du rivage de la mer. Sur le devant, ce sont des orangers, des bigaradiers, des limoniers, disposés en jardins qui offrent toute la luxe des Hespérides. Pour relever la sombre verdure des uns et la monotonie des autres, des caroubiers, des figuiers, des

Invalids who pass the winter at Nice, scarcely ever reside in the town. Some good lodgings, and tolerably well situated, overlooking the terrace, are, however, now to be had; but in the suburb, called the *Croix de Marbre*, and along the sea beach, from the town to the ridge of mountains where the plain terminates on the west, the largest and best houses are to be found; and here strangers generally reside. At the foot of the hill on which stood *Cimiez* there are also some good houses; and this is a situation preferable to the lower part of the plain for patients very susceptible of injury from damp.

Invalids should endeavour to arrive at Nice about the middle of October, or sooner, and should not leave it before the beginning of May. Whatever may be the inconvenience here experienced from the spring winds, the same will be felt in a much greater degree by returning through the South of France; and, accordingly, both Dr. Skirving and myself have known invalids suffer materially from the winds of Provence by leaving Nice too early. It is true that the new road which has lately been opened between Nice and Genoa, admits of the invalid moving in that direction, at a much earlier period than it would be advisable for him to return over the Estrelles to Provence; and when the climate of Nice is found to disagree, a change in the spring in the direction of Genoa may, in some cases, be advisable.

Villa Franca.—This little town, situated on the southern base or rather declivity of a steep and lofty range of mountains, and having a beautiful bay extended out before it, is immediately to the eastward of Montalbano, which separates the bay of Villa Franca from that of Nice. From the north and northwest winds this place is certainly more effectually protected than Nice; it is also sheltered from the northeast, but open to all other easterly winds. In its general characters the climate corresponds closely with that of Nice; it is said to be still drier and somewhat warmer, and it is certain that the vegetable productions are considerably earlier than at Nice. At present there are very few accommodations at Villa Franca, and the communication with Nice is extremely inconvenient. It has long been in contemplation to cut a good road along the sea shore between these two places. Should this be accomplished, the accommodations at Villa Franca will, no doubt, be speedily increased; as sites for building may be found in this secluded little vale more effectually protected from cold winds than any part of the more open and extended plain of Nice.

Menton is also a very sheltered spot, about fourteen miles from Nice on the Genoa road; and *San Remo*, still further, is even more protected from easterly winds. The great mildness of both

jujubiers, des raquettiers, des dattiers, des grenadiers, et toutes sortes d'arbres fruitiers distribués sans ordre, en étalant toute leur vigueur, achèvent d'orner et d'embellir ce bel ensemble."—*Histoire Naturelle*, &c. vol. i. p. 313, &c.

places is indicated by the flourishing state of their lemon plantations. And at Bordighera, in the neighbourhood of the latter, the palm-tree is cultivated on a large scale for the sake of its etiolated leaves, of which it has long afforded a supply for the ceremonials of the church of Rome. But the want of accommodation at these places, at present, prevents the invalid, to whom a change from Nice might be advantageous, from availing himself of it. The increased number of travellers, however, who now pass by the road, lately formed from Nice to Genoa, will most probably soon afford the means of improving the accommodation along this beautiful coast.

ITALY.

Italy possesses great diversity of climate, but my observations are limited to the part situated between the base of the Apennines, and the shores of the Mediterranean. The climate which prevails over the whole of this region, while it exhibits a great similarity of character, differs in several respects from any of the climates already noticed. It is considerably warmer and less humid, but subject to a greater range of temperature than that of the southwest of France; it is softer, less dry, and less harsh and irritating than that of Provence; suffering more from the heavy oppressive winds of the south, and less from the dry searching winds of the north.

The principal circumstance which appears to modify the general character of this climate at the different places, is, their relative position with respect to the sea-shore and the Apennines. In this there is considerable variety; Genoa and Naples are in the vicinity of both, as the mountains at these places approach closely to the Mediterranean; Pisa is only a few miles distant from the latter, and close to the Tuscan hills, a branch of the lower Apennines; Rome is about twelve miles from the coast, and nearly twice that distance from the mountains; Florence is quite embosomed in the Apennines, and the character of its climate is thereby affected to such a degree as scarcely to admit of its being classed with the other Italian climates.

GENOA.

The situation of Genoa, hemmed in between a range of steep mountains and the sea, with little or no surrounding country well adapted for exercise, renders it an unsuitable residence for invalids generally; nor is there much in the character of the climate to recommend it. The summer is hotter, and the winter colder than at Nice; the difference between the mean temperature of the

warmest and coldest months being 35°, while at Nice it is only 28°. The distribution of heat throughout the year is also very unequal, and the temperature by no means steady from day to day. The air is sharp and exciting, but with less of the irritating quality than that of the southeast of France. The climate is, on the whole, dry and healthy, but not suitable to delicate, sensitive invalids. It is more congenial to relaxed, phlegmatic habits. Dyspeptic complaints and gout are said to prevail less at Genoa than at most parts of Italy. For pulmonary affections, Genoa is decidedly an improper residence. It is subject to frequent and rapid changes of temperature, and to dry cold winds from the north, alternating with warm, humid winds from the southeast—the two prevailing winds of the place. To these rapid changes are attributed the inflammatory affections of the respiratory organs, which, with tubercular consumption, cause the greater part of the mortality of Genoa. In some places in the neighbourhood, more sheltered from these winds, inflammatory affections of the lungs are much less common than in the city and its immediate vicinity. Consumption is said to be less rapid in its course at Genoa than in Provence. Rheumatism is frequent, while gout, as already mentioned, is comparatively rare, as are calculous diseases. Scrofula is common. Intermittent fevers are rare, and of mild character.

FLORENCE.

Though Florence is one of the most agreeable residences in Italy, it is far from being a favourable climate for an invalid, and least of all, for an invalid disposed to consumption.

Its situation among the lower Apennines, by which it is almost encircled, and the summits of which are covered with snow during the winter, together with its full exposure to the current of the valley of the Arno, renders Florence subject to sudden transitions of temperature, and to cold piercing winds during the winter and spring. Fogs, too, are more common here than at most parts of Southern Italy. The winter temperature is upon the whole low, while that of the summer is high. The mean annual temperature is only 1½° below that of Rome; but this is owing to the great heat of summer at Florence; for the winter is only 4° warmer than that of London, and is nearly of the same temperature as the winter at Penzance. The difference between the mean temperature of the warmest and coldest months is 36°, which is one degree more than that of Provence. Nevertheless, although the daily, monthly, and annual ranges of temperature are very great, the climate is not more variable or unsteady from day to day than that of Rome, and is less so than that of Naples. The annual range of atmospheric pressure is greater than that of the neighbouring places. The annual fall of rain at Florence is 31.6 inches, but the number of days on which rain falls is only 103, being fewer than at Rome. In the winter the air is rather chilly, and loaded with moisture.

I do not know any class of invalids for whom Florence offers a favourable residence. My own opinion, founded partly on observation, and partly on the reports of invalids, perfectly accords with that of Dr. Seymour of London, and Dr. Down of Southampton, whose more extensive opportunities of observation during a long residence and extensive practice at Florence, make their testimony of greater value. "The winter," says Dr. Down, "is extremely severe and wet, and the spring changeable, consequently highly injurious in complaints of the chest. The inhabitants are very subject to diseases of the lungs; and the acute inflammation of this organ carries off yearly in the winter and spring an amazing number of them, particularly of the poorer classes, whose houses are ill calculated to afford protection against the cold and rains of these seasons."[1] Florence is one of the places in Italy which agrees least with children. Intestinal worms are particularly common there, and dysentery is prevalent in autumn.

PISA.

Pisa has long had the reputation of being one of the most favourable climates in Italy for consumptive patients. It has accordingly been frequented, and continues to be so, by invalids from this country. It is even resorted to, during the winter, by invalids from the rest of Tuscany, from the neighbouring states of Lucca, and occasionally, also, from Lombardy.

The town is built on the banks of the Arno, about five miles from the sea-shore. The surrounding country is flat, except towards the north, where a range of hills shelters Pisa in some measure from the winds of that quarter. It is also protected, in a considerable degree, from easterly winds by the lower Tuscan hills. The Arno, in flowing through Pisa, makes a semi-circular sweep to the north, so that the buildings on the northern bank of the river (*Lung' Arno*) assume the form of a crescent facing the south, and shelter the greater part of the broad space between them and the river from northerly winds. This is the best residence for delicate invalids.

Pisa is not so warm as Rome in winter, and is hotter in summer. In *winter* it is 7° warmer than London, and 2° warmer than Penzance. In *spring* it is 8° warmer than London, and about 7° warmer than Penzance. The range of temperature between day and night is very considerable. According to Professor Piazzini, the fall of rain annually is very great, being 45.66 inches, which is nearly as much as falls in Cornwall. The climate of Pisa is genial, but rather oppressive and damp. It is softer than that of Nice, but not so warm; less soft, but less oppressive than that of Rome. For invalids who are almost confined to the house, or whose power of taking exercise is much limited, Pisa offers advantages over either

[1] Observations on the Nature and Treatment of Fevers and Bowel Complaints, &c. in Greece. By J. Somers Down, M. D.

Rome or Nice. The Lung' Arno affords a warm site for their residence, as well as a sheltered terrace for their walks; but they must be careful to confine themselves to it.

The most common acute diseases at Pisa are peripneumony, dysentery, and gastric fevers. Ophthalmia and cataract are frequent; but this is the case over the whole southern parts of Italy. Consumption is not a common disease, but chronic bronchial affections are frequent; and croup is occasionally met with. At one period, intermittent fevers were very prevalent; but since the country around Pisa has been drained and cultivated, they are comparatively rare. In the hospital, however, a large proportion of the patients who undergo operations, have an attack of this fever, which sometimes even assumes the pernicious form. Hospital gangrene is more common in the hospital at Pisa than in most other hospitals in Italy; and the same may be said of diseases of the bones. Nervous affections likewise prevail, but not so much as at Rome. Calculous diseases are so rare, that Vacca, the celebrated surgeon, during thirty-two years that he had been operating on such patients from all parts of Italy, had not had occasion to operate on one Pisan.

ROME.

The climate of Rome is mild and soft, but rather relaxing and oppressive. Its mean annual temperature is 10° higher than that of London, 8° higher than Penzance, 6° higher than Pau, about 1° higher than Marseilles, Toulon, and Nice; 1° below that of Naples, and 4° below that of Madeira. The mean temperature of *winter* still remains 10° higher than that of London, but it is only 5° higher than Penzance; it is 7° higher than Pau, 1° higher than Nice, and somewhat higher than Naples; it is 4° colder than Cadiz, and 11° colder than Madeira. In *spring*, the mean temperature of Rome is 9° above London, 8° above Penzance, not quite 3° above Pau, and 1° above Nice and Provence; it is 1° colder than Naples, and only a little more than 4° colder than Madeira.

In *range* of temperature (the extent of which is the leading fault of the climate of the South of Europe) Rome has the advantage of Naples, Pisa, and Provence, but not of Nice. Its diurnal range is nearly double that of London, Gosport, Penzance, and Madeira. In steadiness of temperature from day to day, in which our own country, with the exception of the southwest of Cornwall, is so remarkably deficient, Rome comes after Madeira, Nice, Pisa, and Penzance, but precedes Naples and Pau.

Rome, although a soft, cannot be considered a damp climate. Upon comparing it with the dry, parching climate of Provence, and with that of Nice, we find that about one third more rain falls, and on a greater number of days. It is, however, considerably drier than Pisa, and very much drier than the Southwest of France.

At Penzance there falls about one third more rain than at Rome,

and the number of rainy days is also about one third greater. This circumstance, together with the greater evaporation at Rome, owing to its higher temperature, must make a considerable difference in the hygrometrical state of the atmosphere, at the two places. Rome is not so dry as Madeira; as there falls one sixth more rain, and the proportion of wet days is as 117 to 73.

From these comparisons, it would appear that the climate of Rome, in regard to its physical qualities, in one of the best in Italy. One peculiarity of it, deserving notice, is the stillness of its atmosphere; high winds being comparatively of rare occurrence. This quality of calmness is valuable in a winter climate for pulmonary diseases, and to invalids generally, as it admits of their taking exercise in the open air at a much lower temperature than they could otherwise do. To patients labouring under bronchial irritation, wind is peculiarly hurtful. When wind does occur at Rome, during the winter and spring, it is generally from the north, (*Tramontana*,) and is very moderate, at least when it continues for any considerable time. From this quarter there are occasional storms of cold winds; but these are of short duration, being limited, with surprising regularity to three days. The Tramontana is a dry, keen, and irritating wind, resembling in its effects the cold, sharp winds of Provence; and is equally to be guarded against by invalids, who should not stir out of the house while it blows with much force. The southerly winds during the winter and spring do not produce great inconvenience to invalids at Rome. Even the relaxing and enervating effects of the *Sirocco* are not much felt, except by the more sensitive, and plethoric among the healthy, and by them only, after it has continued to blow for a few days. Debilitated invalids, on the other hand, who suffer from great irritability, and a degree of morbid sensibility of body, commonly feel the winter sirocco pleasant. In its effects on the body this wind is directly opposed to the Tramontana.[1] Notwithstanding the character given of this wind by Celsus it is the favourite of the modern Romans; and during the prevalence of the winter sirocco they feel the full enjoyment of health. In the months of March and April, winds are more frequent at Rome; they set in generally in the forenoon, and continue till sunset, when they subside, leaving the nights calm and serene. The effects of these keen, spring winds, combined with that of a powerful sun, are severely felt by the sensitive invalid; though, as far as I could observe, or learn from the testimony of others, in a less degree than at Naples and Nice, and perhaps even than at Pisa.

Diseases.—Among the more prevalent diseases of Rome, *malaria*

[1] The effects of the Tramontana and Sirocco are thus characterised by Celsus: "Aquilo tussim movet, fauces exasperat, ventrem adstringit, urinam supprimit, horrores excitat item dolorem lateris et pectoris. Sanum tamen corpus spissat et mobilius atque expeditius reddit."—"Auster aures hebetat, sensus tardat, capitis dolorem movet, alvum solvit, totum corpus efficit hebes, humidum, languidum."—Liber ii. cap. i.

fevers are the most remarkable, and claim our first notice. In the few remarks I am about to make on the subject, I shall confine myself chiefly to those circumstances respecting malaria, which it is important for travellers to know, with the view of enabling them to avoid its effects.

In the first place, I may observe, that the malaria fevers of Rome are exactly of the same nature, both in their origin and general characters, as the fevers which are so common in the fens of Lincolnshire and Essex, in our own country, in Holland, and in certain districts, over the greater part of the globe. The form and aspect under which these fevers appear, may differ according to the concentration of the cause, or to some peculiar circumstances in the nature of the climate, or season in which they occur; but it is the same disease, from the fens of Lincolnshire and the swamps of Walcheren, to the pestilential shores of Africa; only increased in severity, *cæteris paribus*, as the temperature of the climate increases. In England, and in Holland, these fevers generally appear in the simple intermittent form; more rarely in the remittent form; and they are, for the most part, easy of cure. In France, especially towards the south, the same fevers often assume a more formidable character. Those which, from their unusual severity, and the peculiar character of their symptoms, have received the name of *pernicious*, are by no means uncommon in the southwest of France; and in the rice districts of Lombardy, they are met with in all their varieties; and with a degree of severity, perhaps equal to the more aggravated forms of the malaria fevers of Rome. Even in this country intermittent fevers occasionally assume the pernicious form, and unless medical practitioners in our malaria districts keep this in mind, patients may be lost before the real nature of the disease is discovered.

Malaria fevers seldom appear at Rome before July, and they cease about October; a period during which few strangers reside there. The fevers of this kind which occur at other seasons are generally relapses, or complicated with other diseases. One of the most frequent exciting causes of this fever, is exposure to currents of cold air, or chills in damp places, immediately after the body has been heated by exercise, and is still perspiring. This is a more frequent source of other diseases also, among strangers in Italy, than is generally believed by those who are unacquainted with the nature of the climate. Exposure to the direct influence of the sun, especially in the spring, may also be an exciting cause: it has certainly appeared to me to produce relapses. Another cause of this disease is improper diet. An idea prevails, that full living and a liberal allowance of wine, are necessary to preserve health in situations subject to malaria. This is an erroneous opinion; and I have known many persons suffer in Italy from acting on it. A deranged state of the digestive organs is generally the consequence of this regimen; and under such circumstances the individual is much more liable to disease of every kind. Irregularities in diet are one

of the most frequent exciting causes of malaria fever among the peasantry about Rome, who are the principal sufferers from it. A plain and moderate diet, as it is the most conducive to health generally, so it must, in the present case, best aid the constitution in resisting the cause of this fever. If there is any one circumstance in the state of the constitution, which more than another enables it to combat and to pass through disease, it is, according to my observation, a healthy condition of the digestive organs. In every situation of life, at all ages, and in every climate, this holds true.

In regulating the diet of persons living in a malaria country, regard should be had to the nature of the climate. The same stimulating regimen which might be borne, and even prove useful, in the damp, chilly atmosphere of Holland, will not be suited to the exciting climate of Italy. The peasantry in some parts of Italy are very sensible of this. Sleeping with open windows, either during the day or night, more especially in places subject to these fevers, is very dangerous; and I have known repeated instances of fever produced in this way. Towns are always safer than villages, and the latter than country houses; and the central parts of a town again are safer than the suburbs.

Much has been said about the healthy and unhealthy quarters of Rome; and in this respect there certainly is a material difference in the summer; but in the season during which strangers reside there, this circumstance demands much less consideration. More is to be feared from currents of cold air in the winter, than from a confined humid atmosphere, which last is the evil to be avoided during summer. This circumstance, respecting the effects of different seasons, requires attention, inasmuch as a residence that may be very proper during the winter, may not be so in summer.

It may be stated, as a general rule, that houses in confined, shaded situations, with damp courts or gardens, or standing water close to them, are unhealthy in every climate and season; but especially in a country subject to intermittent fevers, and during summer and autumn. The exemption of the central parts of a large town from these fevers is explained by the dryness of the atmosphere and by the comparative equality of temperature which prevails there. Humid, confined situations, subject to great alternation of temperature between day and night, are the most dangerous. Dryness, a free circulation of air, and a full exposure to the sun, are the material circumstances to be attended to in choosing a residence. Of all the physical qualities of the air, humidity is the most injurious to human life; and, therefore, in selecting situations for building, particular regard should be had to the circumstances which are calculated to obviate humidity either in the soil or atmosphere. A person may, I believe, sleep with perfect safety in the centre of the Pontine Marshes, by having his room kept well heated by a fire during the night.

Persons attacked by this fever should be strictly confined to the house until the disease has been completely checked; after which,

the sooner they change the air, the more likely will they be to avoid relapses, and to prevent a disposition to a return of the disease from being fixed on the constitution—a circumstance of great consequence to the future health of the individual. During the autumn or winter, such persons may go to Naples; but if the spring is far advanced, Florence will be the better place.

The next circumstance connected with the diseases of Rome, which deserves notice, is the peculiar sensibility of the nervous system of its inhabitants. This is evinced, in a very particular manner, by the disposition to convulsive affections, and the singular sensitiveness of the Romans, especially the females, to perfumes. This peculiar susceptibility of the nervous system, appears to be of recent origin. We learn from ancient authors that the Roman matrons were fond of perfumes; and as the circumstance is not mentioned by the Roman medical authors who have more recently written on the climate and diseases of Rome, for instance, Petronio, Baglivi, Marsilio Cagnato, and Lancisi, there can be little doubt that it did not exist in their time. It is to be remarked, that it is not disagreeable odours which produce such effects on the nervous system, but the more delicate, and, to northern nations, agreeable odours of flowers, and other perfumes. Headaches, and numerous other nervous affections, are produced by such odours.

The Roman physicians, who agree in the recent growth of this morbidly sensitive state of the nervous system among the inhabitants of Rome, cannot fix upon any other circumstance, to which it can be fairly attributed, except the indolent manner of life of the Romans, which favours, especially in such a climate, the relaxation and sensibility of the system. Thus Dr. De Matthaeis, after remarking that powerful odours have at all times produced sensible effects on the system, observes, that "there is nothing wonderful in this, if we consider the daily increasing mobility of the nervous system, produced by the luxurious and inactive life of our Romans."[1] Such most likely was the source of this idiosyncrasy, and no doubt still tends to maintain it; while the morbid sensibility of the nervous system, once acquired, is, doubtless, transmitted from parent to child. But though much may depend on the effeminate and indolent manner of living at Rome, the climate, I believe, has some specific effect in inducing this state of the nervous system. The habits of the Romans differ little from those of the inhabitants of the other large towns in Italy, for instance, Naples, Florence, Genoa, &c.: and yet this morbidly sensitive state of the nervous system does not exist, by any means, in the same degree, in these places. Even a temporary residence of some duration in Rome, produces a degree of the same morbid sensibility, and that in cases where the Roman mode of living cannot be adduced as the cause.

Another disease, or rather class of diseases, of much more serious character, but also, in a great degree, of modern origin, is particu-

[1] De Matthaeis Ratio Instituti Clinici Romani.

larly frequent among the Romans, under the name of *Accidente*, and speedily proves fatal. Apoplexy and other diseases of the brain, and diseases of the heart and large blood-vessels, are, I believe, the most frequent causes of these sudden deaths, and originate partly in the same sources as the nervous affections we have already noticed; as do likewise the *capiplenium*, *languor*, and *expletio*, which Petronius remarks as morbid dispositions particularly common among the Romans of his time.

Inflammatory affections of the chest rank next, in point of frequency, among the diseases of winter and spring at Rome. Acute inflammation of the lungs appeared to me more violent and more rapid in its course, than in England and other northern countries. This remark does not apply to Rome only, but I believe to the whole of Italy, and to warm climates generally. When at Dresden, the late celebrated German physician, Dr. Kreysig, remarked to me that he had never witnessed such violent cases of pneumonic inflammation in Germany, as he saw during his stay at Pavia. In Rome, the obstinacy and mortality of pulmonary diseases are greatly increased, by their frequent complication with enlarged and otherwise diseased abdominal viscera, the consequence of malaria fever.

Pure tubercular consumption is not of very frequent occurrence at Rome, the greater number of chronic affections of the lungs being the effect of inflammation. These occur chiefly among the lower classes, who are badly clothed during the winter, and many of whom are predisposed to such affections from having already suffered from repeated attacks of intermittent fever, which have left behind them obstructions of the abdominal viscera.

Headaches are common at Rome, and among strangers I found them of very frequent occurrence. On the other hand, I met with several instances of habitual headaches in young persons disappearing during a residence there. In some cases the headaches were of the pure nervous character, but a large proportion of them originated in errors of diet, and were generally remedied by avoiding these. Persons subject to this complaint, especially if it is connected with irritation of the stomach, should be particularly careful of their diet at Rome, where, owing to the greater sensibility of the nervous system, slighter causes produce headache than in this country.

Among the diseases benefited by a residence at Rome, I may rank *consumption*. In the early stages of this affection, I have generally found the climate favourable. I have frequently known patients who had left England labouring under symptoms that gave much and just alarm, and which continued during the whole journey, get entirely rid of them after a short residence in Rome. The same persons have remained comparatively free from all bad symptoms during the whole season; and this, when from the ultimate result of the case, there could be no doubt of the existence of tuberculous disease at the time.[1] In the advanced stages of consumption, the

[1] Dr. Carlyle, who resided six winters at Rome, writes me, that he was

climate produced no benefit, the disease generally proceeding in the usual course, often more rapidly (especially during the spring months) than it would have done in England.

In *bronchial affections* the climate is very generally beneficial, especially in cases where there prevails great irritability of the bronchial membrane, with much sensibility to harsh, cold winds. I have known many such patients express themselves as feeling much better at Rome than at Nice, or any of the other places where they had resided. Nothing was more common than to meet with bronchial diseases, which, after having been benefited by a short residence at Rome, were greatly aggravated by a visit to Naples, and again relieved by the return to Rome. In chronic bronchitis, indeed, more especially when the disease was of the dry irritable kind, or was complicated with irritation of the digestive organs, a residence at Rome produced the best effects; and in cases of this kind I consider it the most favourable residence on the Continent.

Chronic Rheumatism is generally much relieved; but as this disease is very frequently consequent to, or connected with, a disordered state of the digestive organs, it is necessary to take into account the particular form of dyspepsia, before sending a rheumatic patient to Rome. See the article on "Rheumatism."

With persons disposed to apoplexy, or who have already suffered from paralytic affections, and valetudinarians of a nervous, melancholic temperament, or subject to mental despondency, the climate of Rome does not agree; and in many such cases, indeed, a residence at Rome is fraught with danger; nor is it proper for persons disposed to hemorrhagic diseases, or for those who have suffered from intermittent fevers.

No city in the south of Europe frequented by invalids, affords greater facilities for exercise in the country than Rome. In the variety and extent of its rides it exceeds every other large city I have visited on the Continent. This circumstance, and the immediate vicinity of the public walks to that part chiefly occupied by strangers, renders Rome a far less objectionable abode for invalids than the generality of large towns. The Piazza di Spagna, and streets in that vicinity, afford the best residences. The streets that run in an easterly and westerly direction are to be preferred to those running north and south, as they are less exposed to currents of cold air during the prevalence of northerly winds, and the houses have a better exposure. Both the sitting and bedrooms of delicate invalids should, if possible, have a southern aspect. I had the temperature of several bedrooms noted in the night, and early in the morning, and found considerable difference between those exposed to the north and south. Nervous persons should live in the more open and elevated situations.

struck with the remarkable influence of the climate in preventing the development, and checking the progress of tubercular disease in young persons of a strumous constitution.

Besides care in the selection of apartments, there are other circumstances which require peculiar attention from the invalid residing at Rome. There is no place where so many temptations exist to allure him from the kind of life which he ought to lead. The cold churches, and still colder museums of the Vatican and the Capitol, the ancient baths, &c. are full of danger to the delicate invalid; and if his visits to these be long, or frequently repeated, he had better have remained in his own country. When an invalid does venture into them, his visit should be short, and he should choose for it a mild warm day. It is a grievous mistake to imagine that when once in such a place the evil is done, and that one may as well remain to see the thing fully. This is far from being the case. A short visit to these places is much less dangerous than a long one. The body is capable of maintaining its temperature, and of resisting the injurious effects of a cold damp atmosphere for a certain length of time with comparative impunity. But if the invalid remain till he becomes chilled, and till the blood forsakes the surface and extremities, and is forced upon the internal organs, he need not be surprised if an increase of his disease, whether of the lungs or of the digestive organs, be the consequence of such exposure. Once, and again, these visits may be made without any *evident* mischief; but sooner or later their evil effects will be manifest, as I have very often witnessed. The invalid, unwilling to admit the real cause in such cases, is too apt to impute to the climate, that which in truth arises from his own imprudence and indiscretion, in exposing himself to causes which are not necessarily connected with the climate. Excursions into the country, when the warm weather of spring commences, particularly when made on horseback, is another and a frequent source of mischief to delicate invalids.

The invalid should arrive at Rome in October, and if the chest be the part affected, and he is still very sensible to the spring winds, the beginning of May will be sufficiently early for him to leave it. After this time he should move northwards, being guided by the weather as to the period of crossing the Alps; though this should scarcely be done before the middle, or end of June. About the Lago Maggiore, or Lago di Como, the invalid may pass a week or two, if the weather is such as to render it prudent for him to delay crossing the mountains. The Simplon at this season is the best route from Italy to Switzerland.

NAPLES.

In its general characters the climate of Naples resembles that of Nice more than any other. As at Nice, the autumn and winter are generally mild, and the spring is subject to cold, sharp, irritating winds, rendered more trying and hurtful to invalids by the heat of a powerful sun. The climate of Naples is much more changeable than that of Nice; and, if somewhat softer in the winter, it is more

humid. The sirocco, which is little known at Nice, is severely felt at Naples. The mean annual temperature is higher than that of Rome, Pisa, or Nice; but the annual range of mean temperature is very considerable, being 30°, whilst that of Nice is but 28°; and that of Rome only 26°. The distribution of temperature in the different months is more unequal than at Nice or Rome. The daily range of temperature is also very great, being 2° more than at Rome. The temperature likewise varies very much from day to day, as will appear from the following statement:—The mean variation of successive days at Naples is 3° 36; at Rome it is 2° 80; at Nice 2° 33. The annual range of atmospheric pressure is very small—somewhat less than at Rome, and very considerably less than in the Southeast of France. Rain falls less frequently at Naples than at Rome.

Of the diseases of the inhabitants of Naples, catarrhal affections are the most common. Consumption is not very frequent, nor in general rapid in its course: autumn is said to be the most fatal season to the consumptive. Rheumatism is very frequent. Nervous affections are also common, as are cutaneous eruptions, and diseases of the uterine system. Naples is not subject to any endemic disease, although intermittent fever is not unfrequent in some places in the outskirts of the city. Inflammation of the eyes is very prevalent.

Of Naples as a residence for invalids it is unnecessary to say much. Consumptive patients should certainly not be sent there. The qualities which have been pointed out in its climate, sufficiently mark it as a very unsuitable residence for this class of invalids; and to the list of its defects must be added that of its topographical position, which affords no proper places for exercise, without such exposure as would prove highly injurious to delicate invalids. For chronic rheumatism the climate is certainly inferior to that of Nice and Rome. Naples is, however, well suited as a winter residence for those who are labouring under general debility and deranged health, without any marked local disease. The beauty of its situation, the brilliancy of its skies, and the interest excited by the surrounding scenery, render it a very desirable and very delightful winter residence, for those who require mental amusement and recreation for the restoration of their general health, rather than a mild, equable climate for the removal of any particular disease.

With respect to choice of situation in Naples, invalids with whom a warm and rather close atmosphere agrees, will find themselves best in the Borgo di Chiaja, Vittoria, or Chiatamone. For patients labouring under nervous dyspepsia, and for nervous invalids generally, the Largo del Castello, Pizzo Falcone, and Santa Lucia, afford more favourable residences.

The Neapolitan physicians generally condemn the vicinity of the sea in consumptive cases, and think such patients do better in the more sheltered places behind the town, and in the neighbourhood of the Studio; but here strangers do not reside. Of the situations frequented by strangers, the Borgo di Chiaja and Chiatamone afford

altogether the best residences for pulmonary invalids. These situations are fully exposed to the south, and pretty well sheltered from the north; while their immediate vicinity to the public gardens (Villa Reale) is convenient for walking exercise. But, as I have already observed, Naples is altogether an unsuitable residence for pulmonary invalids.

MALTA.

Malta is in the 36th degree of north latitude, and at a greater distance from the mainland than any other island in the Mediterranean. Its circumference is from sixty to seventy miles, its greatest length eighteen miles, and its greatest breadth twelve. Most of the southern coast is formed of high perpendicular rocks; the other parts are low and have a very barren appearance. The highest ground is, according to Dr. Sankey, something more than 600 feet above the level of the sea.[1]

The whole island consists of calcareous rock covered with but a scanty mould. Notwithstanding this, the culture which is bestowed upon it renders the soil very fertile. There is no intermission of vegetation throughout the year. March and April are the months in which it is in its most luxuriant state. It is very much burnt up during the summer months.

The surface of the island is diversified by hills of slight elevation, and vales. There is neither river nor lake, but numerous springs exist in different parts of the island.

The range of the thermometer during the month of October, November, December and January, on the average of five years, from 1830 to 1835 was as under :—

	Oct.	Nov.	Dec.	Jan.
Maximum, ...	77	69	63½	61
Medium, ...	70½	65	59	56½
Minimum, ...	64	61	54½	53

Rain is of very rare occurrence in Malta during the summer; but it falls in spring and autumn with tropical violence. The autumnal rains usually last from the middle of September to the middle of October. Rain falls most heavily during the night. Very rarely does the rain continue for several days in succession. There is occasionally hail, but never snow. Heavy falls of dew occur sometimes during the summer. Fogs are rare at any season.

The wind which has procured a bad name for Malta with strangers, is the southeast, commonly called *Sirocco*. It is a hot, humid,

[1] Malta considered with reference to its eligibility as a Place of Residence for Invalids.

and disagreeable wind. In winter it is not frequent, and never oppressive. It is most prevalent in the beginning of September. Strangers in general are affected during the prevalence of the sirocco with great lassitude and debility. Persons with diseased lungs suffer more or less from it; but, says Dr. Liddell, "I am not aware of any mischief that it produces in the healthy constitution beyond the temporary discomfort that it occasions."

The climate of Malta may be considered pretty equable, the range of temperature during the twenty-four hours seldom exceeding 6°. The air is almost always dry and clear. Gales of wind are not frequent, but Malta may be said to be a windy place, particularly in spring. Thunder storms are common during the rainy season. The fall of rain is supposed to be about fifteen inches.

Dr. Liddell's account of the winter climate of Malta is very favourable. From the middle of October to the middle of January he thinks it can scarcely be surpassed. The weather is delightful, with the exception of an occasional *gregale*, or northeast wind, which is so chilling, that during its existence, invalids should either stay at home or seek the most sheltered walks or drives. During the period mentioned, the atmosphere is generally clear, and the weather moderate; and the island is usually fanned by the agreeable northwest wind, that sweeps along the channel of Malta, over a sea at the temperature of 72°.[1]

Towards the middle of January the weather becomes unsettled; February and March are usually boisterous and rainy; April, as elsewhere, is proverbially variable; and before June, phthisical patients should leave the island to avoid the sultry summer heat.

The diseases in which Dr. Liddell has observed the climate of Malta serviceable, in conjunction with the important preliminary sea-voyage to it, have been asthma connected with chronic bronchitis—scrofulous swellings and eruptions, dyspepsia and hypochondriasis, and that atrophy and disordered state of health, which are induced by over-active therapeutics. He considers the climate to be peculiarly conducive also to the health of the aged. Dr. Sankey has found it beneficial in chronic rheumatism. The mortality amongst Maltese children is enormous, from their scanty and improper food; but the Maltese women, when well fed, make excellent wet nurses, and the English children that are reared by them, or by their own mothers, thrive remarkably well in Malta. The diseases of children, such as measles, scarlet fever, and hooping cough, are comparatively mild.

When phthisis pulmonalis occurs among the English at Malta, Dr. Liddell thinks it is more rapid in its course than in England. In regard to its frequency among the Maltese, the late Dr. Hennen, according to Dr. Liddell, fell into an error, which has been perpetuated in the Army Medical Reports. It is the confounding of

[1] The temperature of the sea, at the depth of ten or twelve fathoms, was ascertained by Capt. Smyth to be 73° to 76° during the year.

pulmonary consumption with Maltese consumption, a disease which has no necessary reference to the lungs. Instead therefore of six per cent., cases of phthisis pulmonalis, according to Dr. Liddell's tables, do not exceed three per cent.[1]

The immunity of Malta from any endemic disease, the ordinary good health enjoyed by the natives, and by the English, as well as by persons from other countries resident there, and the actual state of the weather throughout the year, have given a character for salubrity to the climate. But from the statistical tables of Major Tulloch, it appears, that even as regards the indigenous inhabitants, Malta is by no means so healthy as Britain. It seems to enjoy only the average salubrity of the states of the south of Europe.

Strangers reside chiefly in Valetta, the capital of Malta, which is one of the finest towns in Europe. It is built on a declivity sloping from south to northeast. The principal streets run north and south, and are swept by the cold northerly winds. The houses are excellent, and the rooms large and lofty.

In Valetta, the inns are numerous and good; and there is no longer any difficulty in finding commodious lodgings, with Turkey carpets on the stone flooring, fires, and other English comforts. Country houses, with gardens and orange groves, may be readily obtained at short distances from the city. The markets are plentifully supplied, and at moderate prices. Valetta is abundantly provided with excellent water, brought from a spring six miles off by an aqueduct. The other places in the island are mainly supplied by rain water collected from the flat roofs of the houses, and kept in cisterns excavated from the solid rock. The principal streets, which are kept very clean, are either paved or macadamized, and readily dry after rain. The roads leading to the country, and round the harbours from Valetta, are kept in good condition, but they are of no great extent or variety. Saddle horses, and close or open carriages, can always be obtained at moderate prices; and there are few entire days in the winter without some hours of sunshine, in which delicate invalids, suitably clothed, may not take exercise with advantage in the open air, on foot, on horseback, or in a carriage. The Maltese boats are clean, commodious, and safe, and will be found, during the numerous calm and mild days of winter, to be the most agreeable vehicles for conveying delicate invalids round the harbours and fortifications, in which the great interest of Malta consists. The most desirable places in Valetta, for a *winter* residence, are those with a southern and eastern aspect, near the Barraccas, looking towards Floriana, or into the great harbour in Strada Levante.

Casal Lia, about three miles from Valetta, is, in Dr. Liddell's opinion, unexceptionable as a residence for phthisical invalids. It

[1] The investigations at present in course by my talented friend Dr. Galland, Professor of Anatomy and Clinical Surgery in the University of Malta, will soon set this question at rest. As far as they have been carried they support the opinion of Dr. Liddell.

is well sheltered, and is contiguous to the public garden of Sant Antonio. This extensive garden has a southeastern aspect, and is surrounded by a high wall, and the walks, which are paved with stone, speedily dry after rain. But with all these advantages, Dr. Liddell fears that suitable accommodation, with good English comforts for invalids, could not be obtained in Casal Lia, although the houses are generally large and good.

"No place," Dr. Liddell sums up, "that I have seen in the south of Europe, can, I think, compete with Malta, for a mild, dry, bracing air, in November, December, and part of January; and, during the other winter and spring months, I think, it is equal to any of them. I have been at them all in winter, except Nice."[1]

There are doubtless on the shores and among the islands of the Mediterranean, situations possessing climates equal to those of the places which have been noticed; but we are not sufficiently acquainted with their characters, and they are mostly deficient in those requisites which are as essential to an invalid as climate. In giving an account of the best climates of the Mediterranean, we have had in view the wants of the more delicate class of invalids. To those who are sent abroad for the prevention of disease, and the improvement of their health, the whole shores and islands of the Mediterranean are open. They may visit the south coasts of Spain, Sicily, the Ionian Islands, Greece, Syria, and Egypt; and, if their tour is conducted with judgment and discretion, their health may be more improved than by residing at any one of the climates mentioned. But the more delicate invalid must rest satisfied with such limited changes as have been pointed out in the preceding pages.[2]

SUMMER RESIDENCE ON THE CONTINENT.

For invalids who require to pass several winters on the Continent, it becomes a matter of importance to select a place where they may spend the intervening summers with the greatest advantage to their health. For those invalids who have passed the winter in Italy, two plans present themselves—either to recross the Alps, or to select the most favourable situation in that country. By the first, the invalid will escape the oppressive heat of an Italian summer; by the latter, he will avoid the inconveniences of a long journey. In deciding between these, in individual cases, various

[1] In drawing up the preceding account of Malta, I have been much indebted to the valuable communications from Dr. Liddell, who was physician to the Royal Naval Hospital in that island for twelve years, and whose statements and opinions are deserving of the utmost confidence. I would here also acknowledge my obligations to the sensible pamphlet by Dr. Sankey, already referred to.

[2] See article Pulmonary Consumption, p. 30.

circumstances will require to be considered, which admit of being noticed here only in a very general manner.

Consumptive invalids will do well to quit Italy; and I may observe that I comprehend in this class, not only those actually labouring under phthisis, but all such as are threatened by it. The summer heat of Italy will disagree with both—in proportion to the advanced period of the disease in the former, and to the deranged state of the general health in the latter. In both cases we generally find a weak and relaxed state of the constitution, accompanied, very often, with a morbid sensibility of the nervous system, in which great heat is always injurious. And when symptomatic fever or morning perspirations have shown themselves, these afford still stronger reasons against a summer residence south of the Alps.

Among this class of invalids some exceptions may, however, be found. Torpid constitutions, in which there is little nervous sensibility, and little disposition to febrile excitement, with a defective state of the cutaneous secretions, and a rigid rather than a relaxed state of fibre, may even derive advantage from a summer passed in one of the more healthy situations in Italy.

But the greater number of invalids who have derived benefit from the Italian climate, during the winter, will do well to quit it in the summer. This remark will apply more especially to those who labour under diseases of the nervous system, depending upon, or connected with, cerebral congestion; indeed, very few of this class of invalids should venture to pass even the winter in Italy, without carefully adapting their regimen to the nature of the climate. Likewise, in cases of irritation of the mucous membrane of the digestive organs, and in congestions of the abdominal viscera, with a deranged state of the functions of the liver, or a disposition to dysentery, the whole south of Europe will disagree during the summer.

The places principally resorted to by invalids, who pass the summer in Italy, are Naples, and its vicinity; Sienna, and the Baths of Lucca. These are the most eligible summer residences south of the Apennines: nor am I aware that any place superior to them in point of climate, and possessing the necessary accommodations for invalids, is to be found in the north of Italy.

The *Vomero* and the *Capo di Monte*, in the immediate vicinity of Naples, afford good situations for summer residences. Of the more distant places, *Sorento*, *Castelamare*, and the island of *Ischia* are the best. Sorento appears to be the coolest of these; for which it is chiefly indebted to its peninsular form, being a long narrow strip of land, having the bay of Naples on one side, and the gulf of Salerno on the other.

Castelamare partakes more of the climate of the Apennines, and affords also their usual shelter of chestnut trees. The air is less dry than at Sorento. From its northwestern aspect, and the mountains which rise immediately behind it, this place enjoys a long

morning shade; but its full exposure to the setting sun renders the evenings often oppressively hot.

At Cava, between Naples and Salerno, the air is said to be drier and cooler than at any of these places.

Sienna affords a healthy summer residence for persons who are not very liable to suffer from rapid changes of temperature, for such often occur here during the summer, owing to the high and exposed situation of the place. Sienna is considerably cooler in the summer, and much colder in the winter, than Naples, Rome, or Pisa. The mean annual temperature is 55°.60; being 6° less than Naples, and only about 5° more than London; but this arises from the coldness of its winter, which is only 1°.38 warmer than that of London. Its summer temperature is about the same as that of Capo di Monte at Naples, but 3° warmer than that of the Baths of Lucca. Its daily range of temperature is very great. It is a dry and healthy climate, and altogether a safe summer residence; and for nervous relaxed people, it forms a better summer retreat than either Naples or the Baths of Lucca, and like the latter place is exempt from mosquitoes. For persons disposed to, or labouring under pulmonary disease, however, Sienna is an unfavourable climate, at all seasons.

Baths of Lucca.—This little watering place, situated among the Apennines near Lucca, is much frequented during the summer; partly on account of its mineral waters, but more on account of the coolness of the situation. This last quality is its chief attraction to strangers. The mean temperature of the summer here is only about 6° higher than the summer of London. In the middle of the day, however, the heat is often oppressive; but the evenings and nights are cool and pleasant, and there are no mosquitoes. June, July, and August, constitutes the proper season at this place. Earlier than June, and after August, the air is damp, and unsuitable to delicate people. There is some variety of situation; the Bagni Caldi are on the brow of a high hill; the Bagni alla Villa are partly on the declivity of a hill, and partly on a plain; and the Pont' a Seraglio is in a valley on the banks of the little river Lima. The Bagni Caldi is the driest situation, and, when protected from the sun, also the coolest. The vicinity of the Bagni alla Villa is warmer, but quieter and more retired. The accommodations, which have been greatly extended of late years at all these places, are pretty good.

The rides on horseback about Lucca are beautiful and varied; but there is only one or two drives for those who require carriage exercise.

The preference to be given to any one of the places mentioned, will depend upon the particular circumstances of the case. Where sea-air is known to agree well, and where passive exercise on the water, or sea-bathing are advisable, some of the cooler situations in the neighbourhood of Naples afford the best residences. On the other hand, where there is much nervous sensibility, and when the

effects of the sirocco are likely to prove injurious, Naples and its vicinity ought to be avoided. The Baths of Lucca and Sienna should be preferred by such invalids, particularly the former, which is a very delightful summer residence.

The accommodations for strangers at Sorento and Castelamare have been greatly increased of late years—walks and drives formed, and bathing machines constructed. An English physician generally resides at these places during the summer.

The island of *Ischia* is also resorted to as a summer residence, and it may deserve a preference by some invalids, on account of its mineral waters. These are very abundant; indeed almost all the water of the island is more or less thermal, and mineralised. Dr. Adair Crawford, who resided a summer in Ischia, found that the heat during the day was moderated by regular sea breezes, and that the nights were very pleasant.

Switzerland.—Although I have not hesitated in advising invalids generally, and consumptive patients in particular, to quit Italy during the summer, I do not feel the same confidence in pointing out an unexceptionable residence elsewhere, more especially for the latter, during that season. Switzerland in point of convenience certainly affords one very eligible; but much caution and prudence are required on the part of invalids labouring under pulmonary affections who remain there. The alternations of temperature are rapid and very considerable. The difference between the day and night is great, and there is often a sharpness in the air which proves irritating to sensitive invalids.

Invalids may pass the summer in Switzerland with safety, provided they use ordinary prudence, and are careful to avoid unnecessary exposure to the vicissitudes of the weather. They should also content themselves with such excursions only as do not cause them to be over-fatigued, or heated at one moment, and exposed, while in a state of perspiration, perhaps, to a cold breeze the next; a thing which is constantly occurring during mountain excursions in Switzerland. They should neither take long fatiguing walks, nor climb steep mountains. They must not attempt to do every thing, and see every thing, like their more robust and healthy friends. In a word, they should not for a moment lose sight of the great object for which they are abroad, viz., the preservation and improvement of their health. Severe attacks of fever, and other acute diseases, are not uncommon consequences of imprudence of the kind alluded to, even among the most robust.

It will not, I hope, be supposed from any thing now stated, that I wish to throw obstacles in the way of young persons, threatened with consumption, taking exercise in the open air. This is so far from being my intention, that I think such persons can scarcely be too much in the open air. All I wish to inculcate is, that they should be careful not to convert the best of all preventives into a source of evil. For this class of invalids, riding on horseback is of all others the most favourable. I am convinced from experience,

that frequent and gentle motion through a mild atmosphere is one of the most soothing and invigorating measures which we possess for allaying an irritated and congested state of the mucous membranes of the lungs, and improving the general health.

The borders of the lake of Geneva afford, I think, the best situations for a summer residence in Switzerland; and the neighbourhood of Geneva is altogether the least exceptionable. Vevey is very hot during July and August. The higher situations about Lausanne are exposed to the north winds, especially the cutting Bise, which frequently blows in the evenings and nights after the hottest days of summer, producing a great and often sudden change of temperature. The low grounds between Lausanne and the lake are close and hot.

The subjects of pulmonary affections, who pass the summer in Switzerland, may try the effects of a course of grapes, "*Cure de Raisins*," a remedy, as already remarked, in high estimation in several parts of the Continent; but on this point the invalid will, of course, be directed by a physician on the spot.

I cannot close these few remarks on the choice of a summer residence without recalling the attention of the reader to the cautions I have already given on the subject of traveling. Unless a journey in hot weather is conducted with great circumspection, the irritation and excitement arising from it in susceptible systems, especially where any organ is in a state of chronic disease, however slight in degree, will do more mischief than any advantage that can be derived from a short residence in the best climate, or from the use of the most valuable mineral waters. It will be more advisable for such an invalid to remain quietly in a situation, even though not the most suitable to him, (but the inconveniences of which may, in a great measure, be obviated by prudence) than expose himself to the danger of having his disease increased by a journey in hot weather.

ATLANTIC CLIMATE.

Various islands in the Atlantic have been recommended as affording favourable winter retreats for invalids; Madeira, the Canaries, and the Azores, in the Eastern, and the Bahamas and Bermudas in the Western Atlantic.

It is to be remarked, that the climate of North America differs materially in its physical characters from that of Europe and Africa. The range of temperature is much greater; the changes more rapid and extensive; the summer heat much higher, and the winter cold much more intense under the same parallels of latitude, on

the American shores than on those of Europe.[1] The western is also more subject to storms than the eastern Atlantic. We shall find a corresponding difference in the climate of the islands under consideration, according as they approach the American or African Continents.

EASTERN ATLANTIC.

The islands of the eastern Atlantic, while they differ considerably in the physical qualities of their climate, differ still more remarkably in their structure, and external conformation, from those of the western Atlantic. The latter are low, arid, and mostly barren rocks, destitute of springs; the former, on the contrary, are lofty, and abundantly supplied with water, and covered with luxuriant vegetation; circumstances which, independently of their geographical position, influence the climate in a very material degree.

MADEIRA.

I shall commence my survey of the Atlantic Islands with Madeira. It is the most important and most frequented by invalids; and the character of its climate being the most fully determined, it will serve as a standard by which to estimate the climates of the other islands.

Madeira has been long held in high estimation for the mildness and equability of its climate, and we shall find on comparing this with the climates of the most favoured situations on the continent of Europe, that the character is well founded.

The mean annual temperature of Funchal, the capital of the island, is 64°56, being about 5° only above that of the Italian and Provencal climates. This very moderate mean temperature, relatively to its low latitude, arises, however, from the summer at

[1] The climate of North America is of that class which Buffon has designated Excessive Climates; that is, having exceedingly hot summers, and intensely cold winters, consequently an extensive annual range of temperature. The following comparison of a few places, having nearly the same mean annual temperature in the Eastern and Western hemispheres, will suffice to show this:—

PLACES.	Mean Ann. Temp.	Temp. of Summer.	Temp. of Winter.	Diff. of Winter and Summer.
Paris,	51°4	66°0	38°0	28°0
Cambridge, Amer.	50°4	70°5	34°0	36°0
St. Maloes,	54°5	66°0	42°0	24°0
Cincinnati,	53°7	72°9	32°9	40°0
Nantes,	55°6	70°7	42°2	28°4
New York,	53°8	79°2	29°8	40°0
Bourdeaux,	56°5	70°7	42°1	28°6
Philadelphia,	54°9	73°9	32°2	41°7

Madeira being proportionally cool. For, whilst the *winter* is 20° warmer than at London, the *summer* is only 7° warmer; and whilst the winter is 12° warmer than in Italy and Provence, the summer is nearly 5° *cooler*. The mean annual range of temperature is only 14°, being less than half the range of Rome, Pisa, Naples, and Nice. The heat is also distributed throughout the year with surprising equality, so that the mean difference of the temperature of successive months is only 2°41; this at Rome is 4°39, at Nice 4°74, at Pisa 5°75, and at Naples 5°08.

Whilst there is much equality in the distribution of temperature throughout the year, there is not less in the progression of temperature for the day, the mean range for the twenty-four hours being 10° by the *register* thermometer, while at Rome it is 10°, at Naples 13°, at Nice 9°, by the *common* thermometer, which gives the extremes observed during the *day* only.

The steadiness of temperature from day to day also exceeds that of all the other climates. In this respect, it is not half so variable as Rome, Nice, or Pisa, and is only about one third as variable as Naples. The degree of variableness from day to day at Madeira, is 1°11; at Rome it is 2°80; at Nice 2°33; and at London 4°01.

The annual range of atmospheric pressure is also very small, being about the same as that of Rome and Naples.

Nearly the same quantity of rain falls annually at Madeira as at Rome and Florence, but at Madeira there are only 73 days on which any rain falls, while at Rome there are 117. The rain at Madeira falls at particular seasons, chiefly in the autumn, leaving the atmosphere, in general, dry and clear during the remainder of the year.

From this comparative view of the climate of Madeira, it must be readily perceived, how great the advantages are which this island presents to certain invalids over the best climates on the continent of Europe. It is warmer during the winter, and cooler during the summer; there is less difference between the temperature of the day and night, between one season and another, and between successive days: it is almost exempt from keen, cold winds, and enjoys a general steadiness of weather to which the best of these places are strangers. During the summer, the almost constant prevalence of northeasterly winds, especially on the north, and the regular sea and land breezes on the south side of the island, maintain the atmosphere in a temperate state. The sirocco, which occurs two or three times, at most, during the season, and then continues for a few days only, (seldom more than three,) sometimes raises the thermometer in the shade to 90°.[1] With this exception, the summer temperature is remarkably uniform, the thermometer rarely rising above 80°. In consequence of the regular sea-breezes, the heat is not so oppressive as that of the summer

[1] The late Dr. Heineken never knew it raise the thermometer, in the shade, above 85°.

in England often is. Close, sultry days are little known in Madeira, and there is neither smoke nor dust to impair the purity of the atmosphere. Such, indeed, is the mildness of the summer at Madeira, that a physician, himself an invalid, who resided for some time on the island on account of his health, doubted whether this season was not more favourable to pulmonary invalids than the winter.[1]

Autumn is the rainy season; and towards the end of September, or the beginning of October, the rains commence, accompanied with westerly or southwesterly winds. In November the weather clears up, and generally continues fine and mild till the end of December. About this time some snow usually falls on the mountains, and rain at Funchal, attended by northwest winds, and the weather continues more or less damp through January and February; but fog is never seen, and even during this, the *winter*, the thermometer at sun-rise is rarely ever found below 50°.

The *spring* at Madeira, as at every other place, is the most trying season for the invalid, and will require even there a corresponding degree of caution on his part. In March, winds are frequent, and April and May are showery.

The mild character of the climate appears to be accompanied with a corresponding degree of health in the inhabitants of Madeira. The peasantry, though hard worked and badly fed, are a fine, healthy, and robust race. "The lower orders of Madeira," says Captain Basil Hall, "appear to enjoy a prodigious advantage over the higher classes in personal appearance—a distinction they owe no doubt, to those temperate and laborious habits of life, which probably they consider as any thing but good gifts of fortune. To our superficial glance, at least, the peasantry of that happy island seemed amongst the most cheerful people we had yet met with."[2] This island is almost exempt from the diseases peculiar to warm climates, and little subject to many of those which are common in more northerly countries. Intermittent and remittent fevers are said never to occur, and continued fevers are rare; croup seems to be unknown; calculous disorders are very unfrequent. The more prevalent diseases are cutaneous affections. Apoplexy is also a very frequent disease. Bowel complaints are very common, and often fatal; and dysentery is said to be frequently epidemic; indeed this disease may be said to be almost endemic, among the labouring classes; nor need this excite our surprise, when we consider their mode of living, which will be presently mentioned.

With respect to the prevalence of consumption among the natives of Madeira, there is a difference of opinion among those who have had the best opportunities of observing. "Though so highly beneficial in this disease, with the natives of other countries," says

[1] See an excellent paper by the late Dr. Heineken, in the Medical Repository, vol. xxii. 1824.

[2] Fragments of Voyages and Travels, p. 154. First Series. New edition, 1840.

Dr. Gourlay, "it is not to be concealed that no malady is more prevalent here than phthisis, with the natives of the island."[1] Dr. Heineken's observation leads him to a contrary conclusion. "It has been asserted," says this gentleman, "that no malady is more prevalent than phthisis with the natives of Madeira; but, as far as my own personal experience and the result of my inquiries go, I incline to a contrary conclusion."[2]

Since the first edition of this work was published, I have made particular inquiries respecting the frequency of consumption in Madeira, and I am satisfied from the information which I have received, that tubercular consumption (with which alone we have to do here) is a rare disease, compared with what it is in more northern climates. "With respect," says Dr. Renton, "to the question relative to the frequency of consumption among the natives, Dr. Gourlay (if he alluded to tubercular disease) has greatly overrated it. Tubercular phthisis occurs more frequently, perhaps, than might, *a priori*, have been expected in such a climate; and I have even known it, in a few instances, sweep off nearly whole families. But it is only necessary to take a cursory view of the habits and circumstances of the natives, to see that they enjoy a singular degree of exemption from a disease, to the ordinary causes of which a large proportion of them is constantly exposed."

The lower classes in Madeira are hard-worked and miserably nourished; their food consists chiefly of crude vegetables and hard-salted fish; they are badly clothed, and worse lodged; their habitations are low miserable huts, and their beds consist of pallets of straw, raised a foot or two only from the ground, damp during nine months of the year. That diseases of the lungs should be frequent under such circumstances is not surprising; and as these are generally neglected, or badly treated, they often prove fatal in a chronic form simulating phthisis. But even if tubercular consumption were a frequent occurrence under the circumstances which we have stated, it would afford no reasonable ground of objection to the climate of Madeira, for persons exempted from such palpable causes of disease.

In my inquiries respecting the influence of the climate of Madeira on disease, I shall confine myself to consumption, which is, indeed, almost the only disease on account of which Madeira has been resorted to. As I never resided at this island, I must rely on the information and opinions, which I have derived from other sources. On this subject, however, I have obtained so much assistance from Dr. Renton, who has long resided in the island, and from the late Dr. Heineken, who spent the last nine years of his life there, on account of a pulmonary disease, that the utmost reliance may be placed on the following observations. Both these gentlemen have

[1] Observations on the Natural History, Climate, and Diseases of Madeira. By William Gourlay, M. D. 1811.

[2] Op. Citat.

published valuable papers on the climate of Madeira, and its influence on consumptive patients. Their opinions regarding the propriety of sending such patients, in the advanced stage of the disease, to this island, are in perfect accordance with those I published on the subject, with reference to the Continent, twenty years ago.[1] And the results of their experience, given below, confirm in the most conclusive manner, the principles which are inculcated in this work, respecting the proper period of sending consumptive invalids abroad. They show the necessity of adopting change of climate as a means of *preventing*, rather than of curing consumption. Dr. Renton, in a sensible paper published in the Edinburgh Medical and Surgical Journal,[2] makes some judicious remarks on the "inutility, not to say cruelty" of sending patients in the advanced stages of consumption, to Madeira.

I give the following interesting and instructive table from Dr. Renton's paper. It is drawn up from the cases of which he had kept notes, during the preceding eight years.

Cases of Confirmed Phthisis . . .	47	
Of these died within six months after their arrival at Madeira		32
Went home in summer, returned, and died, . . .		6
Left the island, of whose death we have heard . . .		6
Not since heard of, probably dead		3
Total		47
Cases of Incipient Phthisis	35	
Of these there left the island much improved, and of whom we have had good accounts		26
Also improved, but not since heard of		5
Have since died		4
Total		35

"In the cases marked *Confirmed* Phthisis, there were copious purulent expectoration, diarrhœa, &c., and almost all of them terminated fatally.

"Some of those marked *Incipient* Phthisis were probably not fully entitled to an appellation so ominous. The subjects were generally young people who were said to have 'overgrown themselves,' and who had been liable in England to inflammatory attacks, having cough, &c. Others had suffered from neglected or mistreated inflammation, and in many there was a strong family predisposition to pulmonary disease. Most of them, I have little doubt, would now have been in their graves, but for the precautionary measure which was adopted."

[1] See "Notes on the Climate of France and Italy," &c., 1820.
[2] Vol. xxvii. 1817.

With respect to the consumptive cases which are likely to derive advantage from a residence at Madeira, Dr. Renton further remarks, "When it (consumption) has proceeded to any considerable extent, I should consider it the duty of a medical attendant not only not to advise the adoption of such a measure, but most earnestly to dissuade from it those who, from hearsay evidence of the recovery of persons in circumstances similar to their own, may feel disposed to fly to it as a last resource.

"That great and lasting benefit is to be derived even from a temporary residence in this climate, which is probably inferior to no other in cases where pulmonary disease is merely threatened, or where strong family predisposition to it exists, many living examples sufficiently prove. But even under such comparatively favourable circumstances, it ought to be strongly impressed on the mind of the invalid, that half measures are worse than useless, and that no advantage is to be derived from climate, however fine, unless it be seconded by the utmost caution and prudence on his part."

The result of Dr. Heineken's observations is quite in accordance with that of Dr. Renton.

Of the thirty-five cases reported by Dr. Heineken, several died before they reached the island, three within a month of their landing, and five or six in about six months. Of forty-seven cases of the same class of invalids in Dr. Renton's report, more than two thirds died within six months of their arrival in the island. This is a melancholy picture of the progress of consumption under all the advantages of the mildest climate; it shows, in a striking point of view, the necessity of discrimination in sending patients to Madeira, and ought to impress medical men with a deep feeling of the heavy responsibility which they take upon themselves in deciding on a question of such importance. By far the greater number of the patients, above referred to, ought never to have left their own country; the advanced period of their disease could leave no reasonable prospect of benefit from such a measure.

The result of the cases sent to Madeira at the proper period is very different. Of thirty-five cases of incipient or threatened phthisis, twenty-six were much improved, and probably a large proportion of them were ultimately saved.

While, therefore, the result of sending patients in an advanced stage of consumption to Madeira shows the inutility of such a measure, to say the least of it, the effects of the climate in incipient cases, and on those threatened with the disease, are highly encouraging, and should lead medical men to recommend such a measure at the time only when it promises benefit.

The following table, for which I am also indebted to Dr. Renton, while it shows the same result as regards confirmed cases of consumption sent to Madeira, exhibits the good effects of sending proper cases. It is also satisfactory to see that much the larger proportion of cases now sent are of the latter description.

Number of Consumptive Invalids who have arrived here from 1st January, 1838 to 31st May, 1840 . . .		182
With Tuberculous Lungs . . .	56	
Died here		30
Left the island		22
Still here		4
		56
Threatened with Pulmonary Disease .	108	
Remained free from symptoms		93
Fell off		13
Lost sight of		2
		108

For some time after the publication of the first edition of this work, Dr. Renton remarked that the proportion of invalids whose cases admitted of benefit from the climate was greatly augmented; but I have reason to fear that the successful issue of such cases has encouraged many to go to Madeira who would have found it better to remain at home.

When we take into consideration the mildness of the winter, and the coolness of the summer, together with the remarkable equality of the temperature during the day and night, as well as throughout the year, we may safely conclude that the climate of Madeira is the finest in the northern hemisphere.

The salubrity of this favoured island also,—its almost total exemption from endemic diseases, and the general mildness of the ordinary complaints, from which no climate nor situation is exempt, contribute to render Madeira a very desirable residence for all invalids who are in a condition to be benefited by a mild and equable climate.

There is no place on the continent of Europe with which I am acquainted, where the pulmonary invalid could reside with so much advantage during the whole year as in Madeira. On this subject I have already cited Dr. Heineken's opinion, which is of the greater weight, as he himself resided in Madeira in consequence of a pulmonary complaint. He found that he rather retrograded during the winter, but always gained ground during the summer. "Could I enjoy for a few years," he observes, "a perpetual Madeira summer, I should confidently anticipate the most beneficial effects." So high, indeed, is his opinion of the summer climate of Madeira, that he suggests the propriety of pulmonary invalids, who can conveniently accomplish such a plan, passing the winter in the West Indies, and the summer at Madeira. Of the effects of such a plan, however, Dr. Heineken does not appear to have had any experience.

The coolness of the summer at Madeira is a very fortunate circumstance for those invalids who ought to pass several winters

abroad, which is the case with by far the greater number of consumptive patients; and for whom it is very difficult to find a good situation during the summer on the Continent, even after a long and often tiresome journey. When it becomes requisite for a whole family to remove to a mild climate, this is a consideration of much weight, more especially when the members of such a family are chiefly females. In Madeira, the invalid has only to change his quarters from Funchal to a more elevated situation in the neighbourhood; or go to the north side of the island. This will be found a still more favourable summer residence, from its being under the influence of the northeast trade wind, which blows constantly there during the summer months, and affords a degree of coolness and freshness to which the residents on the south side of the island are strangers. There is now, in the parish of St. Ann's, an excellent house established for the accommodation of strangers,[1] and other houses are to be had. Dr. Renton says, "that from his personal knowledge of the place, as well as from the accounts of those who have lived there during the three warm months of summer, he has no hesitation in saying, that many whom he formerly recommended to leave the island on the approach of warm weather, and who would in all probability be obliged to return, or go elsewhere, the following winter, might have found a comfortable residence there, and by returning to Funchal, or its neighbourhood, at the proper season, secured the enjoyment of a wonderfully equal temperature during the whole year." The invalid may thus be saved a voyage or journey, and if he is prudent, he will often find that he has gained more in health during the summer than he did in the winter. "As a permanent abode," says Dr. Heineken, in a written communication to me, "I believe Madeira surpasses every other place, because it contains within itself the means of equalising the annual temperature more completely than any other spot with which we are acquainted. The *lowest* to which a thermometer exposed all night in a north aspect has ever fallen in Funchal during five years, is 50°, and the *highest* to which it will ever rise, at such a distance up the mountains as would in every respect suit an inva-

[1] This house is described by Dr. Macaulay, ("Notes on the Physical Geography, Geology and Climate of the Island of Madeira, in the Edinburgh New Philosophical Journal for October, 1840,") as situated in a district of great beauty, rich in plantations, gardens, and vineyards. Between Funchal and St. Ann's there is some of the finest scenery of the island. "Many artists," says Dr. Macaulay, "have endeavoured to delineate the scenery of Madeira; but by far the most successful attempt has been made by Mr. Picken, a young artist of great genius, who has resided for several winters on the island on account of his health. He has made some admirable paintings of the principal scenes, including the city of Funchal. To the geologist these will give a very good idea of the appearances and physical geography of the island, and will be generally interesting as representations of the most remarkable natural scenery in the world."

Mr. Picken's work is entitled, "Madeira Illustrated;" and is published by Day and Haghe, Gate Street, Lincoln's-Inn-Fields, London.

lid, need never exceed 74°. The sirocco visits us so seldom, and its heat may so readily be avoided by closing the doors and windows, that it need not be taken into account. The mean annual diurnal range is from 8° to 10°; but an invalid may with ordinary precaution, and without the aid of fires, live in a temperature never varying within doors more than perhaps 6° throughout the twenty-four hours. In a few words, I would say—there is no occasion for a person, throughout the winter in Funchal, to breathe, night or day, within doors, an atmosphere below the temperature of 64°; or in the country, and at such a height as to ensure dryness, above that of 74°; that he may during the summer take abundance of exercise by choosing his hours without ever exposing himself to oppressive heats; and that in the winter he need not be confined to the house the whole day either by wet or cold more perhaps than a score of times."

"I am acquainted with no place," says Captain Basil Hall, "in which such a variety of climates may be commanded with certainty as in this beautiful island—beautiful in every sense; for the scenery is so varied, that almost all tastes may be suited."[1]

The foregoing evidence is quite sufficient, I think, to show that where climate is likely to be useful in consumption, that of Madeira is preferable to any in the south of Europe; and Madeira has this important advantage over all other places frequented by invalids, as I have just remarked, that they may remain there during the whole year without suffering from oppressive heat, or being subjected to the inconvenience of a long journey. When such consumptive patients only are sent abroad, therefore, as ought to be sent, a proportion of them may pass the summer safely, and often even with advantage in Madeira, particularly on the northern side of the island. But perhaps a larger proportion would suffer from the summer heat even of Madeira, or at least would derive benefit from a cooler and more bracing air. The latter will generally be found among young, growing persons, and more frequently females of relaxed constitutions. To the more firm and rigid frame of the adult, in whom internal congestion is much more to be dreaded than relaxation, the summer at Madeira will often prove more beneficial than the winter.

But how proper soever it may be for an invalid who has passed the winter at Madeira to remain there during the summer, with a view of spending another winter,—a case will rarely occur in which it would be advisable to send a consumptive patient from this country to pass the summer in that island. An invalid, however, who has passed the winter in the West Indies, probably could not select a better situation for his summer residence than Madeira.

Although in my account of the climate of Madeira I have confined myself to its influence on consumption, there can be no doubt

[1] Fragments of Voyages and Travels, *first series.*

of its being highly beneficial in several other diseases noticed in this work, more especially scrofula and bronchial affections.

The only part of Madeira where invalids reside during the winter is Funchal, and its immediate vicinity, which is the warmest part of the island. This advantage it owes to its being open only towards the south, while it is in a great measure screened from the north by the central mass of mountains which rise immediately behind it in the form of an amphitheatre. Invalids peculiarly sensitive to humidity should live within the limits of the town, on account of its greater dryness. The steepness of the island renders wheel carriages useless; invalids must therefore ride, or be carried in palanquins or hammocks. There is abundance of horses, sure footed, and accustomed to the roads. There are some level spots near the town, where invalids may take exercise.

The soil of Madeira is dry, consisting mostly of the *debris* of volcanic rocks. Provisions of every kind are good and abundant, and the water is pure and of excellent quality.

Invalids intending to pass the winter in Madeira, should leave this country in October. The beginning of June is sufficiently early to leave the island to return home, as, before the middle or end of that month, the weather in England is seldom sufficiently warm, or at least steadily so, for a consumptive patient who has passed the winter in a mild climate.

Opportunities of going from this country to Madeira are very frequent. Independently of the regular traders to the island, many West India vessels, and the monthly packets to the Brazils, touch there on the outward voyage. About ten days may be considered the average time of making the passage; frequently it is less, and rarely exceeds fifteen days. The opportunities of returning from Madeira are, however, by no means so frequent; as comparatively few vessels touch there on their voyage to England. Yet I believe that in this respect much inconvenience is not experienced.[1]

CANARIES.

The Canaries group is nearer the African coast, and a few degrees further south than Madeira, from which they are about 200 miles distant.

[1] The reader who is desirous of obtaining information on the natural history, &c. of Madeira, is referred to the writings of Von Buch and Gourlay, to the very interesting work of Professor Daubeny on Extinct Volcanoes, Wilde's Narrative of a Voyage to Madeira and the Mediterranean, 1840, and to Dr. Macaulay's paper already referred to.

A small work, Rambles in Madeira and Portugal, contains much useful information, especially in the Appendix, on the Climate &c. of Madeira, written by the late Dr. Heineken. There has been recently published a small work, The Invalid's Guide to Madeira, by Mr. Cooper, which may be consulted with advantage. Mr. Picken's beautiful work, already referred to, also contains much useful information respecting Madeira, the conveyances to and from it, &c.

Teneriffe is the principal island and the only one of the group possessing accommodations for invalids. Above the range of cultivation, which is chiefly confined to the coast, the island is covered with laurels, arbutuses and pines, whilst the uppermost parts are bare and sterile.

Santa Cruz, the capital, is situated on the southeastern shore of the island, and is a clean, well-built town. The country around is dry and barren.

The mean annual temperature of Santa Cruz, is 70°.9; while that of Funchal, the capital of Madeira, is 64°5. This excess of temperature at Santa Cruz, is not equally distributed over the year; the difference between the summers, at the two places, being greater than between their winters. While Santa Cruz is 7° warmer than Funchal in summer, it is only 5° warmer in winter. The temperature is more equable throughout the year at Madeira; the difference between the mean temperature of the summer and winter being 9°.8, and at Santa Cruz, 12°.3. The heat during the summer is considerably higher in the Canaries than at Madeira; although it would appear that in this respect the summer temperature of Orotava, in the northern part of the island, differs little from that of Funchal and its vicinity.

The climate of Santa Cruz possesses some advantages during winter, in point of temperature and dryness, over that of Funchal, but there are no accommodations for invalids. There are a few places fit for carriage or horse exercise, particularly the terrace leading from Santa Cruz to the Lazaret, which is about a mile long, and broad enough for a couple of carriages to drive abreast. Mosquitoes are found at Santa Cruz during the whole year.

Orotava is a town on the northwestern side of the island, twenty-five miles from Santa Cruz, standing at the foot of the mountain, on ground gently sloping towards the sea-shore. It is surrounded by vineyards and cornfields. The country immediately behind is described as very beautiful, and the roads, though steep, are not so precipitous as those of Madeira. Orotava is cooler, but not so dry as Santa Cruz. The climate, at an elevation of several hundred feet above Orotava, is described as very equable during the whole year. As a residence for invalids, Orotava possesses many advantages over Santa Cruz, in point of accommodations, roads, and beauty of country. The invalid residing at Orotava might, by changing his residence to a more elevated site, remain throughout the summer, without suffering much inconvenience from the heat, and he might pass the winter months in the warmer and drier climate of Santa Cruz.

Laguna, the former capital, which is situated at some elevation above Santa Cruz is cooler, and might form a good summer residence.

Were the accommodations for strangers at Teneriffe, and the means of communication between it and Madeira more frequent,

many invalids might benefit greatly by passing the winter partly at Funchal and partly at Santa Cruz.

The following table of the temperature at Orotava, although for one year only (1834) is deserving of a place here, in the absence of more extensive data. The observations were made with a register thermometer, by Mr. Charles Smith, who has resided several years on the island.

Months.	Mean Minimun.	Mean Maximum.	Mean Temperat.	Mean Variation.	Months	Mean Minimum.	Mean Maximum.	Mean Temperat.	Mean Variation.
Jan.	55	68	61½	13	Sept.	66	77	71½	11
Feb.	56	65	60½	9	Oct.	65	77	71	12
March,	59	69	64	10	Nov.	62	74	68	12
April,	60	71	65½	11	Dec.	60	71	65½	11
May,	63	75	69	12					
June,	65	77	71	12					
July,	66	78	72	12	Means for the Year.	62	73⅓	67	11⅓
Aug.	67	78	72½	11					

AZORES.

The Azores, or Western Islands, lie in the midst of the Atlantic Ocean, about five degrees further north, and considerably more to the westward than Madeira. Of volcanic origin, they rise abruptly out of the water, and present numerous mountains, covered to the very top with perpetual verdure. The conical mountain, which gives name to the island of Pico, and which is about 8000 feet high, has its summit often covered with snow during the winter and spring.

St. Michael's is the largest of the Azores, and, with the exception of the little island of St. Mary's, the southernmost of the group. It is of an irregular oblong form, and extends from west to east rather more than forty-eight miles; its greatest breadth is eleven and its least six miles. The extremities of St. Michael's are mountainous; the eastern end the most so; the highest points rise three or four thousand feet above the level of the sea; the intermediate part is hilly. The soil consists of pumice, volcanic clay, and other decomposed volcanic products, lying upon horizontal strata of basaltic lava.

The chief town of the island is Ponta Delgada, containing upwards of twelve thousand inhabitants. The surrounding country is for many miles tolerably level, and the roads fit for carriages. Asses, for riding and carrying burdens, may be hired for a small sum. Horses and carriages are kept by private individuals.

Consuls for Britain and America, and many English and American merchants, reside at Delgada, and there is a Protestant episcopal chapel and chaplain. Furnished lodgings are not to be had, but houses may be rented at a moderate sum: there are two boarding houses.

Villa Franca, another town on the southern coast of St. Michael's, twelve or fifteen miles to the eastward of Delgada, is more pleasantly situated, being protected behind from the northeast winds by a range of mountains. It has a sandy beach, and its neighbourhood is not so much obstructed by the high walls of orange gardens as that of Delgada. It contains about four thousand inhabitants, but there are no English residents. The soil is a light porous pumice, of from ten to fifty feet in depth, covering the horizontal strata of lava. The heaviest rains are speedily absorbed, so that the roads are left dry. The water which filters through this pumice soil is very pure and abundant.

There are no express accommodations for invalids, but houses may occasionally be hired.

The mean in-door temperature of a room without fire, carpet, or curtains, in Villa Franca, during the period from December 1838 to April 1839, was 60°.9, with a mean range of 3°.6. The mean out-door temperature, during the same time, was 60°.10, and the mean daily range 7°.6. The highest point to which the thermometer rose in the shade, between eight o'clock in the morning and ten at night, was 76°, and the lowest point to which it sank was 51°. Thus, the mean temperature during the winter is about 2° colder than Madeira. It is to be remarked that the averages out-of-doors were not taken with the register thermometer; they, however, approximate the truth, and prove, what is evident to the feelings of the visiter, that the temperature is remarkably steady, ranging little from day to day, and varying little between day and night. Dr. Bullar remarks, "that to his feelings it was always warmer out of doors."

The monthly average of days on which rain fell in Villa Franca, during the period above specified, was ten. This estimate, however, affords little direct information as to the humidity of the climate. The rain on some days was nothing more than a mountain scud, of a few minutes duration; and, at other times, it fell for several hours; but, during the whole five months, there was not a day in which many hours were not available for exercise in the open air. At the same time, the humidity of the atmosphere is so great, that boots grow mouldy in a few days, kid gloves become spotted, books feel damp, and clothes, not constantly worn, have a musty smell. To prevent these inconveniences, the inhabitants frequently expose their clothes to the sunshine. Salt fish soon spoils, so that no quantity is ever kept, and no salt is made in the islands.

The prevalent winds were in December northeasterly; in January, February, March and April, southerly. The southerly and westerly winds are soft and warm. The northeasterly are cold, but not keen. The sirocco is never felt at the Azores. Gales and stormy winds blow from the southward and westward, and are not unfrequent.

	Register Thermometer within doors.				Thermometer in the open air at four hours of the day.						Days when rain fell.	Days with southerly winds.	Days with N. E. winds.	Prevailing winds.
	Max.	Min:	Med.	Ran.	A. M. 8	P. M. 1	P. M. 6	P. M. 10	Med.	M. daily range.				
Dec.	60	57	58.5	4	55	63	52	58	57	5	17	12½	10	N.E.
Jan.	63	60	61.5	3	60	64	58	58	60	9	13	17½	10½	S. E.
Feb.	63	60	61.5	3	63	66	60	58	61.25	8	10	25½	1½	S.W.
March	64	60	62	4	61	66	61	60	62	6	14	21½	2	S.W.
April	63	59	61	4	62	66	59	56	60.25	10	. .	. .	. .	S. E.
Mean	62.6	59.2	60.9	3.6	60.2	65	58	58	60.18	7.6	10.8	19.25		

The islands of Terceira and Fayal, next in importance to St. Michael's, are about 160 miles to the northwest of that island, in the centre of the group, together with three others, Pico, St. George, and Graciosa. From what he heard, Dr. Bullar thinks Fayal damper than St. Michael's.

The principal town of Fayal is Horta, pleasantly situated on the east side of the island, on rising ground sloping down to the margin of a fine bay. It contains several thousand inhabitants, many Americans and their consul, besides an English consul and physician. There is a boarding house, and houses may be rented. The country around affords a considerable variety of pleasant walks and rides.

There is constant communication between the Azores and England, during the winter, when the oranges are exported. The communications between the different islands is frequent after March, but uncertain during winter.

In all the islands, poultry, eggs, and fish are abundant and cheap. In the chief towns, beef and mutton can be procured, as well as milk and butter. The bread is light and good. The wines indifferent, but unadulterated.

Water at St. Michael's is good and abundant. The soil when cultivated, is rich and productive. The whole of the islands abound in fine scenery, but there is a deficiency of trees, though not of vegetation.

The climate of this group of small islands, situated in the centre of the Northern Atlantic, nearly equidistant from the poles and the equator, and surrounded on all sides by a vast extent of ocean, is purely oceanic, and affords one of the best examples of a mild, humid, equable climate to be met with in the northern hemisphere. It is slightly colder and more humid than Madeira, but probably even more equable.

In diseases in which a soft, soothing climate is indicated, that of the Azores will prove beneficial; in gastritic, or inflammatory dyspepsia, and in bronchial irritation, accompanied with little secretion. On the other hand, in a relaxed state of the system—in those morbid conditions of the mucous membranes, attended with copious

discharges—and in an enfeebled state of the digestive organs, (atonic dyspepsia,) it will decidedly disagree.

There are many cases of a mixed character, where irritation of the mucous surfaces co-exists with a relaxed state of system. In such the climate may prove beneficial for a time, but as soon as the state of irritation is abated, its relaxing effects will prove injurious. A removal to a drier and more bracing climate would then be desirable and even necessary.

The most prevalent disease among the natives is gastrodynia, or a painful affection of the stomach; a dull, continuous pain, lasting many hours. This is not surprising when the principal food of the poor (whose diseases were those which chiefly fell under the observation of Dr. Bullar) consists of cabbage and potatoes chopped up with a little lard. Painful affections of other parts are next in frequency; rheumatic neuralgia, lumbago, sciatica, neuralgic pains of the face, neck, and arms, hemicrania and loss of power, partial paralysis. Of acute diseases, bronchitis was the most frequent; asthma also prevailed; phthisis is very rare.[1]

Comparing Madeira, the Canaries, and the Azores, it will be observed that, although in some circumstances they are alike, they are very dissimilar in others. They have the same form and geological structure, being all mountainous and of volcanic origin, but differ materially in their vegetable productions, and in the character of their climate, both as regards humidity and temperature. There is a gradual transition from the humid, soft, equable climate of the Azores, of which the mountains are covered to the very summit with evergreens, to the arid, rocky soil of Teneriffe where the want of rain during the greater part of the year renders much of the island dry and sterile. Madeira, situated considerably more to the south than the Azores, and more distant from the African coast than the Canaries, presents an intermediate climate in comparison with these two groups. Less humid than the Azores, and less dry than Teneriffe during the winter, it has the advantage of a cooler summer than either. This it owes chiefly to its being within the limits of the trade winds during the hot season.

A change from the Azores to Madeira, and from thence to Teneriffe, would, in many cases, prove more beneficial than a residence during the whole winter in any one of these islands.

[1] For the above account of the Azores, I am indebted to my friend Dr. Bullar, who passed the winter and spring of 1839–40 there; and who, in conjunction with his brother, has just published an interesting work descriptive of these islands, entitled, "A Winter in the Azores."

WESTERN ATLANTIC.

BERMUDAS.

The Bermudas consist of a cluster of small, low islands. The largest is only twelve miles long, and about three broad; and the whole extent of the group, from one extremity to the other, is not more than twenty miles. The highest point of land in any of the islands does not exceed 200 feet above the sea level. They are composed chiefly of a coarse, shelly sand-stone of an extremely porous quality, and so soft as to be cut easily with the saw and adze into the various forms necessary for building, &c. From the absorbing nature of the Bermuda rock, the soil, which is naturally thin, is extremely arid. There are no springs, the inhabitants being almost entirely dependent upon rain water, which is collected on the roofs of the houses, and by other artificial means, and preserved in stone cisterns, called *tanks*. The water is generally good, but the supply is occasionally deficient in very dry seasons. Although the Bermuda islands are low, they are by no means flat, the surface being of an undulating and even hilly character. The high grounds are mostly covered with cedar trees, which, while they form a peculiar feature, are the most beautiful ornament of these islands, and, at the same time, their most valuable production. But there can be no doubt that Bermuda might be made much more productive by proper cultivation; as has indeed been proved during the non-intercourse with America. It is, however, in general, supplied with provisions from the United States and our North American colonies.

TABLE of the Range of the Thermometer at St. George's on an Average of Five Years:—

MONTHS.	THERMOMETER.			DIURNAL RANGE.		
	Max. deg.	Med. deg.	Min. deg.	Greatest. deg.	Mean. deg.	Least. deg.
January	72	65¾	55	8	4	1½
February . . .	71	64⅔	53	10	5⅔	1
March	72	65	54	9¾	4⅓	1½
April	71	64¾	56½	10	5½	1½
May	75	70	57	11	6¼	2
June	86	79	68	10	7	3
July	89	83½	75	12	7½	2
August	89½	83	75	12	8	1
September . .	87	82½	74	9	6	4
October	86⅓	76¼	65	10	4⅘	1
November . . .	82	76½	64	7	4	0½
December . . .	76	69⅓	56	8	4½	0½
Mean	79¾	73½	63	9½	5⅔	1⅔

From the small size and little elevation of the Bermudas, they are fully exposed to winds from every quarter, and are under the

immediate influence of all the changes which occur in the atmosphere of the surrounding ocean; which, as we have already remarked, is more liable to great and rapid changes of temperature, and more subject to storms than the Eastern Atlantic.

Bermuda may be considered upon the whole a healthy place. There are no endemic diseases, although occasionally, during the autumn, fevers of a character resembling those which form the scourge of the West Indies, prevail with considerable violence; but this is by no means an annual occurrence. Bowel complaints are the most common diseases. Consumption is also frequently observed among the inhabitants; and it appears from the Army Reports that inflammation of the lungs and consumption are very prevalent among the troops stationed there. The ratio of mortality from consumption being nearly nine per thousand of the strength annually, which is more than among the troops in the United Kingdom, or in any of the Mediterranean stations.

The cool season, that is, from October till May, is the most healthy, and the only part of the year during which this climate is at all suited to invalids. One of the principal objections to Bermuda, as a winter residence for pulmonary invalids, is the prevalence of strong winds; which are such as to justify the epithet applied by Shakespeare to these islands, "the still-vexed Bermoothes." Of these winds the damp, oppressive southwest is the prevailing; but the most violent and injurious to delicate invalids during the winter and spring, are the northwest winds which are generally dry, sharp, and cold. Compared, however, with the climate of the coast of America, under the same latitude, Bermuda may be said to have no winter. The summer is very hot; being generally admitted, I believe, by those who have experienced both climates, to be more oppressive than the same season in the West Indies. This may be accounted for, partly from the want of the trade winds, and partly from the bare, arid nature of the soil, which becomes quite parched during the summer. Vegetation almost disappears at this season; the cedar and wild sage alone resisting the heat. Dew is occasionally deposited in winter, when a cold night succeeds a hot day, but never in the summer. The principal fall of rain is between August and October; there are also very heavy showers in January and February, but seldom any during the summer months.

From what has been stated, a tolerably accurate opinion may be formed respecting the general qualities of the climate. It is variable and windy during the winter, and hot and oppressive in the summer. Compared with Madeira, which lies in the same parallel of latitude, the climate will be found much more unequal. The temperature of the two places during the winter may be much the same; but there is a wide difference in that of summer. The coolness of this season at Madeira forms a striking contrast with the oppressive heat of Bermuda.

With so few advantages in point of climate, the Bermudas are not likely to become the resort of invalids from this country. Their

great distance, the infrequency of communication with England, and the defective accommodations for strangers, form additional objections. Provided, however, that domestic circumstances rendered Bermuda a convenient residence, invalids might pass the winter there safely, and perhaps with benefit. There are many beautiful spots in these islands, where, protected from the northerly gales by the cedar-clothed hills, the invalid might find sufficient space to enjoy exercise in the open air, almost every day during the winter. The neighbourhood of the little town of Hamilton, situated nearly in the centre of the islands, affords perhaps the most favourable situation for such a residence.

BAHAMAS.

Were we to consider the latitude only of these islands, they might almost be classed with the West Indies, as they are on the very limits of the tropics; but their vicinity to the American continent so modifies their climate, as to give it a different character from that of the intertropical islands. The Bahama islands form a very numerous group, of which about twelve are of considerable size. They are all low, and chiefly of coralline formation. They contain no natural springs, water being procured only by digging deep wells; and, in many places, the water thus obtained is not good.

The easterly, or trade wind, although the prevailing wind, is much less regular here than in the same latitude on the eastern side of the Atlantic. Southerly winds, which are hot and oppressive, often occur, and are generally accompanied with a heavy deposition of dew during the night. The northwest wind frequently prevails; and as this wind blows with very considerable force, it produces a rapid fall of temperature, more especially when it immediately follows a southerly wind.

The following table shows the monthly range of the thermometer at Nassau, on an average of five years,—1830 to 1834 inclusive:—

Months.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov	Dec.
Max. .	77½	76	80½	83	86½	89	92	90	89	83½	79	76½
Med. .	71	73	75	79	81½	84½	86	86½	85	79	73	70
Min. .	66	69½	69	75½	77	80	83	83	81	73½	67	63½

Average,—Max. 83½, Med. 78½, Min. 74.

From May to November the range of the thermometer is from 75° to 85°, seldom rising above 90°. This increase of temperature is generally accompanied by southerly winds or calms, which are described as being very oppressive.

According to these tables, the mean annual temperature is 78½°; and the range 28½°; viz., from 63½° to 92°. In the West Indies,

the former is 80°, the latter 20°. The temperature of the seasons is as follows: winter 71°, spring 77°, summer 83°, autumn 80°. At Barbadoes, the winter is 76°.7, spring 79°, summer 81°, autumn 80°. From this comparison it appears, that while the winter is nearly 6°, and the spring 2° colder, the summer is 2° *warmer* than at Barbadoes: the autumn temperature at both places being the same. The explanation of the high temperature of the Bahamas, during the two latter seasons, is probably to be found in the frequent occurrence of southerly winds during that period of the year, and in the less degree of regularity of the trade winds at these islands than within the tropics. In the winter and spring, however, the temperature is considerably lower, and this is the period of the year which chiefly interests us in our present inquiry.

At New Providence, the weather, during the cold season, which extends from November to May, is generally fine, clear, and dry; the thermometer in the shade being generally from 60° to 70°, the mid-day heat tempered by a constant breeze, and the evenings cool and agreeable.

The Bahama islands, generally speaking, are not unhealthy; although there is a considerable difference in this respect between the different islands. That of New Providence, in which is the capital, Nassau, the only town in the colony, is not by any means one of the healthiest, on account chiefly of some swampy ground which it contains. The small island, called Harbour Island, close to Eleuthera, one of the largest of the group, is esteemed particularly healthy, and forms the chief resort of invalids and convalescents from New Providence. There are several other healthy spots, as on the island of Abaco; but at all these places there is a great deficiency of accommodations, and moreover, they are sixty miles distant from Nassau, the only place where medical advice is to be found.

The most prevalent diseases, are fevers, chiefly of the intermittent and remittent character, and bowel complaints; cholera is not uncommon, and occasionally the Bahamas are visited by epidemics of yellow fever; but the two first mentioned diseases are by far the most prevalent.

From the above description, it appears evident that the Bahama islands are not well calculated for the generality of invalids. The climate is not suited for consumptive patients, on account of the rapid changes of temperature, and the prevalence of winds, often of a dry, cold character. At the same time persons, for whose cases a warm climate is indicated, may pass the winter in the Bahamas safely; and residents in the West Indies might derive considerable benefit by a change to these islands for a few months during this season. The wet and dry seasons occur pretty regularly at the same periods of the year, as within the tropics. The same rules which are laid down, in the article on *The West Indies*, respecting the arrival and departure of invalids, and the conduct to be observed

during their residence, are generally applicable to those visiting the Bahamas.

THE WEST INDIES.

I consider it necessary to notice the West India Islands, because they are occasionally recommended as a winter residence to patients labouring under pulmonary and some other chronic diseases; and because their climate, either as regards its physical characters or its influence on disease, does not seem to be generally known or understood by medical men in this country.

The mean annual temperature of the West India Islands near the sea, is about 79° or 80°; the mean daily range about 6° only; and the extreme annual range not more than 20°. The mean temperature of the sea at considerable depths in the vicinity of these islands is 80°; and this is also the temperature of the springs near the level of the sea in Jamaica, as noticed by Dr. Hunter.[1] The mean temperature of the seasons, according to the European division adopted in this work, is at Barbadoes as follows—winter, 76° 7; spring, 79°; summer, 81°; autumn, 80°.

The above applies to the whole of these islands near the level of the sea; the difference in different islands being scarcely worth remarking. The mean temperature of Barbadoes, according to Hillary, is 79° 3; the greatest range in six years being 17°, viz. from 70° to 87°; and Dr. Thomas makes this 18°, viz. from 70° to 88°. Sir Gilbert Blane once found the thermometer in this island at sun-rise, in December, at 69°.[2] Dr. Hunter observed it once only at the same degree; and twice only as high as 91° in Jamaica.[3] The greatest range which I find noticed by any author at the sea level is 22°, viz. from 70° to 92.° Dr. Fergusson says, the mean daily range in summer is from 80° to 86°, and in winter from 70° to 80°. The mean temperature of Grenada, at noon, according to Dr. Chisholm, is 84°, and at seven A. M. 78° 5. This gentleman gives the following, as the diurnal progression of temperature:—"The thermometer (Fahrenheit's) almost universally exhibits the following movements. At seven A. M. the mercury begins to rise, and continues to do so till one P. M., from which time till four P. M. it is stationary. It then begins to fall, and continues to do so till ten P. M., from which time till seven A. M. it is again stationary. This routine of temperature is disturbed only when any remarkable change takes place in the atmosphere, such as much rain attended with strong wind: the greatest change from this cause I have observed is 10°, the least 4°. The thermometer, exposed to the direct rays of the sun, has risen in ten minutes to 130°, or 42° above its stationary point at one P. M. of that day; 30° may, however, be considered the medium difference between the heat in the shade

[1] Observations on Diseases of the Army in Jamaica.
[2] Diseases of Seamen. [3] Op. citat.

and in the sun.[1] The medium difference between the heat of the atmosphere at one and ten P. M. is 9°."[2] At Jamaica, Dr. Arnold always observed the mercury begin to rise about 10 or 15 minutes before the sun emerged from the horizon. Its ascent was gradual until it reached its maximum, which generally happened between two and four P. M. He tried many thermometers for the purpose of ascertaining the extreme solar heat, and often observed the mercury rise to 130° Fahr. in the month of September.

The winter, and early part of the spring, are in general remarkably dry, and the weather fine; the wind being more northerly than usual. The summer is dry and hot; and autumn the season of the heavy rains; but there is seen little of that continuous rain which occurs in temperate climates. The annual fall of rain is probably about 65 inches;[3] but in the quantity of rain which falls in the different islands there is a much greater difference than in their temperature. In the mountainous islands, generally, the fall much exceeds that in the low islands. At Martinique, for example, the fall is said to amount to 100 inches; while at Barbadoes, according to Hillary, it is 58; and at Antigua only 45 inches. The greatest fall of rain takes place in October. In November the weather generally begins to clear up, the northeasterly winds resume their regularity; and from the beginning of December till the vernal rains of April and May, the weather is dry, settled, and comparatively cool.

From the rapid manner in which the rain descends within the tropics, a large proportion of it is carried off in torrents, and it must be remembered that the evaporation is extremely rapid. At Antigua it amounted, in 1818, to 28·26 inches, the fall being 65. The evaporation in the different seasons was as follows:—Winter, 6·26; spring, 6·99; summer, 8·09; autumn, 7·06; leaving unevaporated—

[1] This great increase of temperature is not produced by the direct power of the sun's rays, but is caused chiefly by the concentration and reflection of heat from the surface of the earth. If the influence of reflected heat be avoided, the difference between the sun and the shade amounts, in the West Indies, to a few degrees only. Baron de Humboldt often endeavoured to measure the power of the sun between the tropics by two thermometers of mercury perfectly equal, one of which remained exposed to the sun, while the other was placed in the shade. The difference resulting from the absorption of the rays in the ball of the instrument never exceeded 6° 6 Fahr.; sometimes it did not even rise higher than one or two degrees. Mr. Daniell's observations go far to show "that the power of solar radiation in the atmosphere increases from the equator to the poles, and from below upwards."—*Meteorological Essays and Observations.*

The temperature in the shade often rises higher in northern latitudes than in the West Indies. It is the duration of heat much more than its intensity, as Humboldt justly remarks, which characterises the climate of the tropics. And I may add, that it is this unceasing heat which is one of the principal causes of the injurious influence of tropical climates on European constitutions.

[2] Manual of the Climate and Diseases of Tropical Countries, &c., by Colin Chisholm, M. D.

[3] Edwards gives from 60 to 65 inches as the average fall throughout the whole islands.—*History of West Indies*, vol. i. p. 12.

winter, 5·41; spring, 6·22; summer, 6·39; autumn, 19·53. I am not aware of any series of hygrometrical observations having been made in the West Indies.[1] In the lower islands little dew is deposited; but in the higher islands, where the range of temperature is greater, dew falls in considerable quantity, but still in a very small proportion when compared with the opposite continent of America. In Jamaica dew is often heavy, and Dr. Melville informs me that it is not unfrequent in St. Vincent's.

The range of atmospheric pressure is remarkably small. At Antigua, in 1818, this amounted to half an inch only; and, according to Dr. Chisholm, it does not exceed an inch in any year.

From the small size of the greater number of these islands, there do not occur the regular alternations of land and sea breezes which prevail generally in tropical climates, but the same circumstance admits of the influence of the easterly, or trade wind, without intermission. This wind prevails, with great regularity, for nine months of the year. During August, September, and October, the trade winds are much more irregular, but still the prevailing wind is decidedly the east. It is chiefly owing to the full influence of the trade wind that the climate of the West India Islands is not only tolerable, but infinitely more agreeable than Europeans who have never visited them can possibly imagine, when the temperature, as indicated by the thermometer, is alone considered. It would appear from a register now before me, kept on board one of H. M. ships, that the temperature of the air at sea is very nearly the same as on the small islands.[2]

We have now to inquire into the influence of this climate on disease, and more epecially upon *Consumption.*

Respecting the prevalence of consumption in the West Indies, there exists considerable difference in the statements of those who have had ample opportunities of observation. Dr. Musgrave remarks of the occurrence of phthisis among the whites, that the subjects of it are almost invariably of families in which hereditary predisposition has been long established. Amongst the blacks, Dr. Musgrave's patients have been chiefly native Africans, disbanded soldiers for example, or their immediate offspring; the creole negro of many generations being comparatively free from pulmonary disease of every kind.

On the other hand, it appears from the Army Reports, that nearly twice as many cases of consumption originate among our troops in the West Indies as at home; twelve per thousand of the aggregate strength of our troops serving in the West Indies being attacked annually, while of the Dragoon Guards serving in Great Britain,

[1] I am informed by Dr. Musgrave that such are now in progress of being made by his colleague Dr. Nicholson.

[2] In this journal, the temperature of the sea-water is often noted in the harbours, and at great distances from land, at various depths short of 100 feet. It varied from 76° to 83° 5. On one occasion the temperature of a torrent of rain as it fell, is marked 77°, the temperature of the air being 78°.

the proportion is only six and a half per thousand. The disease, according to the same reports, is even of more frequent occurrence among the black than the white troops.

If we have found cause to condemn Italy as a summer residence for consumptive patients, there seems no just reason why we should commend the West Indies, even in winter, the temperature of which is above the summer temperature of any place in the south of Europe.

More extended experience, and more accurate observation, however, than has hitherto been applied to the cases of pulmonary invalids sent abroad, can alone enable us to speak positively on this point. In the mean time, every thing that we know regarding the nature of consumption, and the influence of a high temperature on it—supported by our practical experience of the effects of the climate now under consideration, bear us out in laying it down as a general rule, that the climate of the West Indies is an improper one for patients with tuberculous disease of the lungs.

As my own personal experience on the subject is rather limited, it may be as well to notice the opinions of those whom a residence in the West Indies has afforded ample opportunities of judging. Dr. Hunter, speaking of Jamaica, observes:—"Pulmonary consumptions rarely originate in the island, but those who come from England with that complaint already begun, are not benefited by the warmth of the climate; on the contrary, the disease is precipitated, and proves sooner fatal than it would have done in a more temperate air. Of this we had repeated examples among the soldiers, several of whom arrived in the island with *beginning* consumptions, and were all quickly carried off by that disease."[1] Dr. Musgrave and Dr. Arnold agree in this opinion; and Dr. Chisholm states, that catarrh, pulmonic inflammation, and phthisis pulmonalis, are very frequent in the West Indies; that these diseases are very rapid in their progress; that when phthisis is fully established, there is no safety in remaining in the climate. A sea voyage, and temperate or cool climate, presents then the only, or at least the best, chance of life.[2] The opinions of Dr. Fergusson, Sir Alexander Dickson, and Dr. M'Arthur are equally strong on this subject; and these gentlemen, as well as Dr. Chisholm, had peculiar opportunities of observing the effects of climate on a very large scale. Dr. Fergusson had the direction of the army medical department in these islands for several years; Sir A. Dickson was physician to the fleet in the West Indies six years, and Dr. M'Arthur had charge of the Royal Naval Hospital at Barbadoes for six years. It was customary in our navy at that time to draught seamen, labouring under chronic pulmonary diseases, into ships going to the West Indies; and it was constantly observed, that the progress of consumptive cases, to a fatal termination, was much more rapid than is generally observed

[1] Op. citat. [2] Op. citat.

in more temperate climates.[1] Dr. Fergusson remarked the same thing among the military; the disease, to use his own words, "resembling, in its progress, an acute rather than a chronic affection;" and Sir A. Dickson's language is equally strong on this point.

It is unnecessary, I presume, to adduce further evidence to prove the injurious effects of the West India climate on confirmed consumption.

The next point for consideration is the influence of this climate on persons predisposed to consumption. Those who have had the best opportunities of judging, are in favour of it as a prophylactic means. Dr. Fergusson who had extensive opportunities of observing the influence of the climate upon our troops, and Dr. Melville who has long practised in St. Vincent's, are of this opinion. Dr. Musgrave, who has practised twenty-six years in Antigua, says, that it has never fallen to his lot to see a single case of consumption commencing in a European, whether hereditarily predisposed or not, who had arrived in the West Indies in perfect health. Dr. Arnold found the climate of Jamaica very favourable to young persons from fifteen to twenty years of age, hereditarily predisposed to consumption.

Dr. Jackson, of Boston, U. S., whose experience has been somewhat large, thinks favourably of the West Indian climate in consumption; but he does not define the periods of the disease in which he finds it most useful. He sends patients chiefly to Cuba; there to remain till the last of April; then to change to Georgia, or South Carolina, and to return to Boston very slowly, so as not to reach New England till the end of June.

Much will depend upon the nature of the constitution—whether it is such as is calculated to bear a tropical climate well, or likely to sink under the irritating and exhausting effects of heat. When the morbid condition of the system, which gives reason to fear the approach of phthisis, depends chiefly upon hereditary predisposition, and occurs in early life, especially in feeble irritable constitutions, the climate of the West Indies will rarely agree. At a more advanced period of life, and in constitutions free from much disorder of the nervous system, and of the digestive organs, the climate may prove useful. The revolution effected in the distribution of the circulating fluids and in the secretions, may have the effect of enabling a constitution in which there exists considerable powers, to overcome the tuberculous diathesis.

Independently of the nature of the patient's constitution, other circumstances will deserve consideration; for instance, whether the invalid can command the accommodations and comforts necessary

[1] So well convinced was Dr. M'Arthur of this, that he thought it his duty to communicate the fact officially to the head of the Naval Medical department; and I am informed by Sir William Burnett, Inspector General of the Navy, that the practice of sending consumptive sailors to this and other hot climates has long since been discontinued.

upon a voyage, and during his residence in the West Indies; whether he may have the power of selecting a proper situation, and of quitting the country on the approach of the summer heat, &c.

It is a remarkable fact, confirmed to me by Drs. Arnold and Musgrave, that persons obviously predisposed to consumption are rarely attacked by the indigenous fever.

The cases of Pulmonary Consumption, therefore, in which the climate of the West Indies promises advantage are very few, and their character scarcely ascertained; while those in which it produces mischief are numerous, and generally well marked. Of persons predisposed to the disease, a certain proportion are likely to be benefited by the climate,—but the nature of the constitution should be well considered before it is recommended even as a prophylactic.

The affections of the chest most likely to derive benefit from a residence in the West Indies are chronic diseases of the bronchial membrane, occurring in persons otherwise of a tolerably sound constitution. "Persons," says Dr. M'Arthur, "labouring under chronic cough, about the middle period of life, and whose health is otherwise good, derive much benefit from the climate." In asthma, however, the same gentleman has generally observed the climate injurious. In both these statements, Dr. Melville's experience leads him to coincide. Dr. Arnold, however, did not find it so in Jamaica, where he has seen many cases of this disease benefited by the climate. I have not myself had sufficient experience to enable me to form an opinion on the subject; but I can have no doubt that the cases in which the climate will prove most useful, are those in which the disease is chiefly confined to the bronchial membrane, and in which the digestive organs are in a sound state.

In stomach complaints the West Indies are very generally unfavourable. The extreme activity of the cutaneous circulation, excited and kept up by the great heat of the atmosphere, although it may diminish internal congestion, induces, I am inclined to think, after a time, an irritable condition of the mucous membrane of the stomach and bowels, combined with a state of relaxation, which greatly predisposes to dyspepsia, dysentery, and other disorders of the abdominal viscera, and to gastric fevers:—diseases which make up almost the sum of mortality among Europeans in the West Indies. At the same time I do not mean to deny that in certain cases of dyspepsia, of long standing, a residence in this climate may prove beneficial; just as we find other great changes, of various and even opposite kinds, in the condition of the individual, effect a cure in this and other diseases, of which, in our limited knowledge of the animal economy, we are unable to render a satisfactory explanation.

Chronic Rheumatism.—The marked benefit derived in this disease from a mild climate, probably led to the belief that the West India and other tropical climates would prove still more beneficial. Experience, however, has not justified the expectation. While some cases of the disease are benefited by the climate of the West

Indies, others are, on the contrary, aggravated by it. When the rheumatic affection is symptomatic of, or accompanied with, an irritable state of the digestive organs, or a feeble relaxed state of the system, the climate will disagree. "Chronic rheumatism," says Dr. M'Arthur, "when the general health is unimpaired, is much relieved, but when the health is deteriorated, the powers of the digestive organs much weakened, or the disease attended with profuse perspirations, nothing but a return to a cooler climate can save the patient." In my own opinion, the climate is too hot for the generality of rheumatic patients. Our soldiers and sailors are frequently invalided from the West Indies on account of rheumatism. Dr. Grainger says that this disease, in the chronic form, is more prevalent there than in this country, especially sciatica; and Dr. Wright adds, that acute rheumatism is frequent in the West Indies.[1] Hereditary gout, Dr. Musgrave says, is often as severe in the West Indies as in England. On the other hand, Dr. Arnold states that gout and rheumatism, according to his experience, are of rare occurrence in Jamaica, and he has known many cases of these diseases benefited by a temporary residence in the West Indies; but in Jamaica it is to be remarked, rheumatic affections are much less prevalent among our troops than in the Windward and Leeward Command, or in Great Britain.—*Army Reports.*

Calculous disorders are rare in the West Indies. Dr. Musgrave has met with stone in the bladder *once* only, but he has seen several cases in which renal calculi, after the usual symptoms, were passed by the urethra. Dr. Arnold, during an extensive practice in Jamaica of twenty years, met with two cases only of calculus. Diseases of the heart and large vessels are also rare, and the osseous deposits, which are so generally found in the coats of the larger arteries in persons who die at an advanced age in cold climates, are said to be rarely met with in those who die at a similar age in the West Indies.

The climate generally proves serviceable in scrofula, which is a rare disease in the West Indies. Dr. Fergusson, in particular, speaks in strong terms of the beneficial effects which he has observed the climate produce in scrofulous diseases; Dr. Melville coincides in this; but Dr. Arnold limits the utility of the climate to incipient states only.

In the higher districts of the interior of Jamaica the children are uncommonly fine; and the children of Europeans and Creoles continue to thrive well till they attain the age of eight or nine years, after which they generally begin to droop. At this age, therefore, children should be sent to a more temperate climate. Dr. Arnold remarks that the diseases of childhood, measles, scarlatina, &c., are generally mild.

To persons of weak irritable constitutions, or with irritable

[1] Essay on the More Common West India Diseases, by James Grainger, M. D.

bowels, or deranged digestive organs generally, or with an irritable skin, or subject to cutaneous eruptions of an irritable character, or too copious perspirations, the West Indies will prove injurious. Persons subject to severe headaches, or who have any hereditary disposition to cerebral disease, or to insanity, and fair plethoric people generally, should also avoid the tropics.

Having given an account of the climate of the West Indies, in general, I shall now notice the islands which are considered the most healthy, and where invalids may obtain all the advantages which the climate affords. These are Jamaica, Barbadoes, St. Vincent's, Antigua, and St. Kitt's.

In many other islands there are, perhaps, to be found situations equal in point of salubrity to any of these; and there are among the small islands more than one entirely free from all endemic sources of disease.[1] Yet the islands just named possess advantages, which, upon the whole, render them preferable to all the others as the resort of invalids. Of these, St. Vincent's and St. Kitt's are mountainous; Barbadoes and Antigua are low islands. As St. Vincent's lies in the vicinity of Barbadoes and Antigua, near St. Kitt's, the invalid may without much inconvenience or difficulty change his residence, and in some degree his climate, by passing to the higher situations in the neighbouring mountain island, and the reverse. This, as we shall have occasion to show, is a matter of considerable importance.

Jamaica.—On account of the size of the island, and the height of its central ridge of mountains,[2] the climate of Jamaica differs in some respects from that of the other islands. It has a greater range of temperature, and, therefore, a greater variety of climate. There is a considerable difference between the lower and higher parts, and between the north and south sides of the island. It has also the advantage of a sea and land breeze, which the smaller islands have not. Dews are abundant. More rain falls on the north than on the south side of the island. On an average of five years it rained 116 days; the fall is 50 inches. The difference of temperature between the north and south sides of the island amounts to 5° during the whole year, and in the first three months of the year to from 8° to 10°.

In the mountainous districts of St. Andrew and Port Royal, there

[1] Of this kind is one of the small islands called the *Saintes*, situated between Guadaloupe and Dominica, which possesses an excellent harbour. But there are here no accommodations for invalids.

[2] The altitude of the highest of the three peaks of the Blue Mountains is 8,500 feet above the level of the sea.

The temperature averages, from January to April, in the early morning 55°, in the afternoon 70°;

From April to June	60°,	in the afternoon	75°
„ June to Sept.	65°,	ditto,	80°
„ Sept. to Dec.	65°,	ditto,	75°

This may be considered the mean temperature of a series of years.

are residences and settlements, three or four thousand feet above the level of the sea, where the air is temperate and salubrious all the year round, but more particularly from the month of January to the end of May. Probably the most healthy district is the mountainous part of the parish of St. Ann, which is nearly in the centre of the island.

The mean temperature of the year at this place is 76°. It is generally speaking a dry district; there are no morasses or jungle, and the carriage roads are excellent.

Convalescents from other parts of the island often derive considerable benefit from a residence of a few weeks only in this region. It is also a safe temporary retreat for consumptive as well as other invalids.

Lucea also, has a high reputation for salubrity among the inhabitants, and is often resorted to by convalescents; the climate is cool and pleasant except during the months of July, August and September.

Barbadoes is one of the healthiest islands; it is almost entirely free from marshy grounds; and, from being cultivated throughout, and comparatively level, it affords more opportunities of exercise than many of the others. The capital, Bridgetown, although more healthy than most of the sea-ports in this country, is the most unhealthy spot in the island. It should, therefore, be avoided as a residence by the invalid. Speightstown, on the northwestern extremity of the island, is the best residence in the form a town; but if accommodations could be found, the higher grounds in the interior of the island possess many advantages. The part of the island called Scotland is from 600 to 800 feet above the level of the sea, and is constantly perflated by the trade wind. It is therefore cooler than the lower parts of the island, without being subject to the great and sudden alternations of temperature, which are experienced in the more elevated situations of the mountainous islands. This district is also remarkably healthy. So high an opinion did Dr. Fergusson form of the salubrity of this spot, he informs me, that after a careful topographical survey of the whole Caribbean Archipelago, with which he was occupied three years, he recommended it officially to government as the best situation for establishing a general convalescent depot, for the debilitated invalid troops of all the other islands, instead of sending them to Europe as was the usual custom.

Notwithstanding the uniformity of temperature which prevails among these islands, the effect of a change from one to another is often very remarkable in improving the health. This has been observed frequently, on a large scale, among our troops stationed in the West Indies; and, indeed, I believe, one of the most powerful means of diminishing the sickness among our troops in that climate, would be to remove them frequently from one healthy island to another; or still better, send them to sea for a few weeks.

St Vincent's lies directly to the westward of Barbadoes, from

which it is distant only a few hours sail. Its capital, Kingston, is almost peculiar, Dr. Fergusson remarks, in being built in a healthy site on the shores of a fine bay. A cool situation may be found by ascending the mountains which compose the greater bulk of this beautiful and romantic island. But here the difficulty of finding accommodations will be still greater than in the higher parts of Barbadoes.

Antigua, although one of the low islands, is, in many parts, considerably more elevated than Barbadoes. There are some unhealthy spots in this island, but the greater part of it is healthy; and many positions on its rounded hills favourable to health may be found. The fall of rain is forty-five inches. Dryness of atmosphere characterises the climate both of Barbadoes and Antigua. Antigua bears the same relation, in point of elevation, to St. Kitt's, that Barbadoes does to St. Vincent's. The climate of Antigua, according to the Army Reports, may be considered as more favourable both to white and black troops than most of the others in the command.

St. Kitt's, (or St. Christopher's) is one of the most beautiful islands in the West Indies, rivaling Barbadoes in many respects, and excelling it in others, as a residence for invalids. Indeed, among my medical friends, who have visited the Caribbean Islands, I think the greater number give this island the preference over all the others, certainly over all the high islands. The greater part of St. Kitt's is healthy; and from its mountainous character, it affords the invalid an opportunity of seeking a cooler climate; but here, unfortunately, the means of accommodation are greatly limited; and we speak rather of what it might afford, than what it really possesses. A situation of this kind, called Spooner's Level, is described by Dr. Fergusson, in a written communication to me, as embosomed in the great volcanic central ridge, which divides the island longitudinally; and at an elevation of 1400 feet above the level of the sea, in a climate, and amid scenery truly beautiful, affording the most delightful atmosphere which he ever breathed. St. Kitt's has also the advantage of excellent roads. Considering all things, St. Kitt's, as a high, and Barbadoes as a low island, appear to deserve the preference over all the other small islands. But a more advantageous and better plan for the invalid, than residing in any one island, would be to cruize among, or make short visits to the different islands. St. Kitt's, from its situation among a group of islands, is well situated for the head quarters of an invalid, having such a plan in view.

The little island of *Nevis*, in the immediate vicinity of St. Kitt's, and similar to it in its physical characters, deserves perhaps to be mentioned. It is considered very healthy.

By referring to what has been stated respecting the seasons in the West Indies, the proper time for the residence of the invalid in that country will be found to be from the beginning of December to the end of April. This period is alone suited to invalids who

visit the West Indies for the recovery of their health. It is the coolest and most healthy part of the year,—the epithet *healthy* being applied to it, in contradistinction to the autumn, which is termed the *unhealthy* season, from being the time during which the endemic diseases, which are the scourge of the West Indies, prevail with the greatest force. By leaving England in the end of October, or beginning of November, the invalid would reach the West Indies at the proper season; and he should contrive, if possible, not to return to this country until the end of June.

Before concluding the subject of the West Indies, it may be well to add a few remarks on the management of the invalid during his voyage to, and residence in these islands, as this is a subject on which he is likely to receive very contradictory, and often very erroneous counsel.

On approaching the tropics, when about the 25th or 24th degree of latitude, where the temperature ranges from 70° to 80°, a degree of general excitement is very often experienced, and a disposition to catarrhal affections which demands particular attention on the part of the invalid labouring under any chronic pulmonary disease.

The proper means to prevent any injurious effects from the increase of temperature, is to live somewhat more abstemiously than usual, and upon less exciting food. The quantity of wine generally drunk should be diminished, or it may be advisable to abstain from wine altogether. Long exposure to the direct rays of the sun, should also be avoided. Attention to these circumstances, with the use of a little cooling laxative medicine, will generally be all that is necessary on arriving in the West Indies. For some time afterwards a continuance of the same simple, unexciting regimen, should be persevered in, in order that the system may become habituated to the exciting influence of a high temperature, and until the increased cutaneous secretion, which appears to be one of the principal means employed by nature to enable the living body to bear the heat of a tropical climate without injury, is fully established. Whether approaching or residing in the West Indies, this, says Dr. Arnold, is the grand secret for the preservation of health, and to the neglect of it, and the adoption of an opposite mode of living, is to be attributed in a great degree the sickness and mortality among the European residents in these islands, and indeed in all tropical climates. Exercise in the middle of the day, and exposure to currents of air while in a state of perspiration, should be carefully avoided. From these two causes, and an over-exciting diet, are produced a great proportion of the diseases which prove so fatal to Europeans in the West Indies. With respect to clothing, it is now universally admitted, I believe, by those who have resided in a tropical climate, that flannel is the safest and best covering next the skin. Although the general temperature of the winter is very high, yet dry, cool winds, frequently occur, and give rise to catarrhal and other inflammatory affections of the lungs. In March and April, when the greatest difference exists between the tempera-

ture of the day and night, Dr. Hunter found catarrhs frequent in Jamaica. Dr. Chisholm states, that in those parts of the islands especially which are exposed to the sharp northerly winds of the spring, called *norths*, the inhabitants are annually afflicted at that season with pulmonary and hepatic inflammation. He adds further, that it is a grievous error to believe that catarrhal complaints are rare in the torrid zone; and, in addition to his own experience, he cites that of M. Desportes, an intelligent French physician, who practised many years in the island of St. Domingo, who observes that "les habitans des pays chauds sont encore plus sujets aux catarrhes que ceux des temperés." A medical friend, who long enjoyed an extensive practice in Barbadoes, and to whom I am indebted for some useful information on the subject of this article, informs me, that epidemic catarrhs are frequent in that island, and often prove fatal to the black inhabitants; and Hillary also describes catarrhal fevers as of frequent occurrence in Barbadoes in his time, and often epidemic, spreading over the whole island, and sparing neither whites nor blacks.

It must not be believed from this, that Barbadoes is more subject to catarrhal affections than the other islands; they have only been better described. Dr. Grainger, who practised in St. Kitt's, observes, that coughs are common in the West Indies, from the latter end of October to the latter end of February.[1] Dr. Arnold, in his work, has also remarked the occurrence of bronchial affections in Jamaica, but describes them as mild compared to the same diseases in England, and as being curable by very mild treatment.[2] Dr. Musgrave agrees in this, and says that epidemic influenza sometimes prevails, but is a mild disease, easily yielding to the simplest remedies.

There is one circumstance in the character of tropical diseases, which the European visiting these colonies should be fully impressed with, and that is, their violence and very rapid progress. This is more especially the case with fevers and inflammations; in such cases, the remedies require to be applied early, and with an energy proportioned to the violence of the disease. On this account it is advisable to call in medical advice the moment disease makes its attack.

From what has been said, it is manifest, that he who visits the West Indies, more especially with a view to the restoration of his health, requires to conduct himself with great circumspection.[3] Nor must his care cease with leaving these islands. On returning to this country, he has to guard against the effects of the change of

[1] Op. citat.

[2] A Practical Treatise on the Bilious Remittent Fever, &c. To which is added, Medical Topography of the Different Military Stations in Jamaica. London, 1840.

[3] For more detailed information respecting tropical diseases and hygiène, the reader is referred to Dr. James Johnson's comprehensive and valuable work, The Influence of Tropical Climates on European Constitutions. Fifth Edition, London, 1836.

climate, and must provide for it by suitable clothing. In this respect he should anticipate the change of climate; and avoid exposing himself long, on deck, to damp, cold winds. The complaints most likely to attack persons returning from a hot to a cold or temperate climate are diarrhœa, catarrh, and rheumatism, or a relapse of any disease to which the person had been subject. All these may be prevented by warm clothing, attention to diet, and avoiding unnecessary exposure in cold and damp weather.

APPENDIX.

I.

CLIMATES OF THE SOUTHERN HEMISPHERE.

I have limited my observations in the foregoing pages to the climates of the Northern Hemisphere; but the Southern Hemisphere also affords climates in every way congenial to the European constitution, and calculated to exert on the health the same beneficial influence as the best northern climates. The Cape of Good Hope, Australia, and New Zealand, present themselves for choice among the British possessions, and offer peculiar advantages to those whose inclination or circumstances lead them to seek a permanent settlement in the climate which is most likely to suit their constitution.

Although we have not any very extensive data by which to estimate the precise characters of the climates of these different regions, we yet have the experience of a considerable period, during which, with the exception of New Zealand, the countries above named have been inhabited by the English; and even respecting New Zealand we possess information which enables us to form a tolerably accurate opinion of the climate, and its influence on the health of natives of this country, and to compare it with the other places referred to in the Southern Ocean.

From the situation south of the Equator of the countries under consideration, their seasons are the reverse of ours. Thus August, September, and October constitute the *Spring* months; November, December, and January, *Summer;* February, March, and April, *Autumn;* and May, June, and July, *Winter*,

CAPE OF GOOD HOPE.

For the few remarks to be made on the climate of the Cape I am indebted chiefly to the Army Returns, so often referred to.

The range of the thermometer at Cape Town, taken on the average of seven years (1827—33), was as under:—

Months.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov	Dec.
Max. . .	86	84½	82	78	73	67½	65½	67	68	72½	77	80
Med. . .	78	76½	75	71	66½	61	59½	61	62½	65½	70	74
Min. . .	72½	70	68½	65½	61	57	56	56	57	60	63	69

A table such as this, however, which only indicates the range of the thermometer in the shade, cannot convey any adequate idea of the intense heat occasioned by the reflection of the sun's rays from the adjacent mountains.

The character of the atmosphere is that of dryness; but the scarcity of rain and moisture, which renders a great part of the interior in certain seasons a barren desert, is much less experienced in the Cape district. The average number of days on which rain fell during a series of years, was seventy-five, and the quantity which fell averaged 41 inches, annually.

The most common winds at Cape Town are from the southeast and northwest. The former is the prevailing wind of the summer season, and from its blowing over the sandy flats between the town and Simon's Bay, is usually sultry, relaxing, and debilitating; the latter, the prevailing wind of the winter months, being a sea-breeze, is cold, chilly, and often accompanied by heavy falls of rain and violent gales.

Southwesterly winds prevail during spring and autumn, and from passing over the wide expanse of the Southern Ocean are generally surcharged with moisture, which wraps the summits of the mountains over Cape Town in dense fogs. As the upper stratum of the air becomes cooled, the fogs rapidly descend in tempestuous blasts, causing an immediate reduction of temperature, with an equally sudden transition from an extremely dry to a damp raw state of atmosphere. These winds are often accompanied with rain, which, however, is never so heavy as that brought by the winter wind, being only what is commonly known by the name of a "Scotch mist!"

From the Army Reports it appears, that the climate of the Cape district is at least as favourable to the health as that of Britain. Fevers of the intermittent and remittent type are extremely rare among the troops, and unknown among the inhabitants. The troops are less subject to diseases of the lungs at Cape Town than in our other colonies; and there is a smaller proportion of deaths from consumption than has been observed on any foreign station, except the East Indies. Rheumatism, which is more frequent among the civil inhabitants even than among the troops, prevails among the latter to a greater extent than at home, or in the other colonies.

The *Eastern Province*, including the new settlement of Albany, although subject to sudden variations of temperature, is in an eminent degree favourable to the European constitution. From the Army Reports as well as from what is known in regard to the mortality among the civil population, there can be no doubt that this portion of the colony is more favourable to health than the United Kingdom. The low ratio of sickness and mortality among the troops has been mainly attributable to the extreme rarity of diseases of the lungs. Pneumonia and consumption in particular are still less frequent than at Cape Town. Fevers also are even more rare and less fatal, but rheumatic diseases are exceedingly common.[1]

The places chiefly resorted to by invalids from India and England at the Cape of Good Hope, are *Rondebosch*, about five, and *Wynberg* about eight miles from Cape Town. At both places there are many comfortable commodious houses to be hired, and three public boarding-houses. There is a church at each place, and good English society. Living is very moderate.

These places are much cooler than Cape Town, chiefly owing to their being open to the southeast wind, which blows nearly the whole summer.

There are shady walks and rides, but the roads are very dusty.

The following will give an idea of the climate to be obtained during the summer months. The observations were taken in a sitting-room at Rondebosch, door and windows generally open, not much exposed to the sun, by the late Rev. Mr. Ash—

	Aver. Range of 24 hours.	Aver. tem. at 2 o'clock.	Extremes. min.	Extremes. max.	Rain fell on
From Dec. 17th to Dec. 31st. . .	$65\frac{1}{4}$ to 69	68	61	77	2 days
January	$67\frac{1}{2}$ to $70\frac{3}{4}$	$69\frac{1}{2}$	65	76	7 days
February	$67\frac{6}{7}$ to $71\frac{3}{7}$	$69\frac{6}{7}$	65	$78\frac{1}{2}$	7 days
March	$65\frac{5}{6}$ to $69\frac{1}{5}$	$67\frac{3}{10}$	61	74	7 days

AUSTRALIAN CLIMATE.

In a tract of country of such extent as Australia, various climates must necessarily be found. The settled districts are between the 30th and 43d degrees of south latitude, and possess generally a

[1] In regard to the frequency of rheumatism at the Cape, Dr. Smith says, in a letter to me, "that he is much disposed to attribute it to the injudicious practice which prevails, among persons of all classes, of seeking comfort in currents of cold air while in a state of perspiration, and often while much of their clothing is thrown off." It is to be remarked, that in New South Wales, which is similar to the Cape in point of climate, rheumatism is also prevalent and severe.

climate, which, though it may be characterised as temperate, and such as is congenial to the European constitution, presents several peculiarities.

New South Wales.—We are better acquainted with the climate of New South Wales than of any other part of Australia.

One peculiarity of the climate, is its liability to occasional great droughts, for instance five months without rain, as in 1826. Another evil of the climate is the occasional prevalence of dry sultry winds.

"The most singular phenomenon," says Dr. Lang, "in the meteorology of New South Wales, is the occasional prevalence of hot winds from the northwestward. These winds occur on an average four times every summer, and blow from twenty-four to thirty-six hours each time, the atmosphere all the while feeling like a current of heated air from a furnace, and the thermometer generally standing at from 90° to 100° of Fahrenheit. It has even stood as high on one occasion, within my own experience, as 112½°. This hot wind is usually succeeded suddenly by a wind from the south, which causes the mercury in the thermometer to descend with great velocity."[1]

The following table for Sidney affords a pretty good idea of the climate as regards temperature:—

Means of the Thermometer, from May, 1821, to April, 1822, according to Major Goulburn; and from May, 1822, to May, 1823, according to Sir Thos. Brisbane.

	Goulburn.	Brisbane.	Mean.
January	72.14	72.86	72.50
February	73.04	68.36	70.70
March	71.80	59.90	65.85
April	67.46	59.00	63.23
May	61.16	59.90	60.53
June	57.20	53.42	55.31
July	55.04	51.44	53.24
August	54.86	56.48	55.67
September	60.98	61.88	61.43
October	64.76	68.00	66.38
November	65.84	71.96	68.90
December	72.14	73.94	73.04
Summer	72.50	71.78	72.14
Autumn	66.20	59.54	62.87
Winter	61.34	52.78	57.56
Spring	63.86	67.28	65.57
Annual	64.40	63.14	63.68

The observations of Goulbourn were made at three different hours, viz. six o'clock A. M., noon, and eight, P. M.

[1] Historical and Statistical Account of New South Wales. London, 1837.

Yearly mean for	6 A. M.	. . . . .	63.14
do. do.	Noon	. . . . .	65.48
do. do.	8 P. M.	. . . . .	64.94

This shows how small the daily range of temperature is.

Fall of Rain.—The following was the number of days, according to Goulburn, in each month on which rain fell during the year, from May, 1821, to April, 1822:—

May—, June 9, July 8, August 10, September 9, October 6, November 8, December 7, January 7, February 14, March 19, April 12.

The number of rainy days for May has been omitted; but if eight be allowed, the number for the whole year will be 107. In 1813–14, a year of drought, the number of days on which rain fell was only 61.

From the general dryness of the air, the heat in New South Wales is much less oppressive at equal degrees of temperature than in England.

In the winter the cold is but little felt in the lower parts of the colony bordering on the sea; but in the interior the frosts between night and morning are strong enough to leave upon the shallow pools ice of the thickness of a shilling.

South Australia.—The climate of South Australia is described as pleasant, except during the summer months, when the heat is disagreeably great. "The only objection," says Mr. James, "I have to the climate, *is the extreme changes of temperature*, generally three times a-day, increasing greatly the difficulty of escaping colds. At present, for example, the thermometer in the morning may be about 66°; 96° or 98° at mid-day; and 66°, or even lower, again by night."

From the general dryness of the air, however, the heat is much less oppressive than might be expected from the height of the thermometer.

Swan River.—The climate of Western Australia is much the same as that of New South Wales, only more moist, and not so liable to droughts.

Van Diemen's Land.—The climate of Van Diemen's Land is free from the droughts of the Australian Continent, and though cooler is more changeable.

The following is the result of Sir Thos. Brisbane's thermometrical observations made at Hobart Town during the year 1822:—

January	62.96	October	53.96
February	63.14	November	57.56
March	55.40	December	62.96
April	53.60		
May	45.68	Spring	52.88
June	41.00	Summer	62.96
July	40.10	Autumn	51.44
August	45.50	Winter	42.26
September	47.12	Year	52.34

There is little or no snow; the climate is dry; the breezes generally become gales, and when from the south, which is almost daily, they are felt to be very cold. From October 16 to February 23 (the summer in Van Diemen's Land), the weather was as follows:

Rainy	42
Strong winds	24
Fine and pleasant	28
Very fine	29
Wind too hot	7

Hottest day, 25th January, thermometer in the shade, 99½°; coldest day, 16th of October, 56°.[1]

The climate of Australia is, according to all accounts, remarkably healthy. Fevers are almost unknown, and the same may be said of hooping-cough, croup, &c.

Europeans, enervated by a residence in India, become very much invigorated and improved in health by a short stay in Australia.

Dysentery is the most prevalent and most fatal disease to which the colonists are subject. Few new comers, it is stated, escape an attack; and of the convicts who die in the civil hospitals, it is the cause of death in one half.

By a statistical report of the cases treated in the civil hospital at Sydney, in the year 1835, it appears that the most prevalent diseases were dysentery, rheumatism, ophthalmia, and catarrh; the number of cases of these four diseases being together 1937, out of a total number of 2654.

Catarrh prevails as an epidemic from time to time.

Owing to some deficiency in the returns, the Military Statistical Report on the Diseases of Australia, has not yet been completed, but in the introduction to the volume last presented to parliament we find it stated, that "the extreme salubrity of the climate may be estimated from the circumstance that on the average of twenty years, from 1817 to 1836 inclusive, the mortality did not exceed fourteen per thousand of the force annually, whereof more than a fifth part arose from violent or accidental deaths, principally attributable to the nature of the duties on which the troops were employed. Thus the mortality from disease alone could have amounted to little more than one per cent. annually, being lower than in any other colony, except the Eastern Provinces of the Cape of Good Hope, to which the climate of Australia is in many respects similar."

In the Transactions of the Provincial Medical and Surgical Association, a summary of the diseases treated in the Colonial Hospital at Hobart Town, for a period of eleven years, from 1821 to 1831

[1] Journal of a Gentleman visiting Van Diemen's Land to recruit his health after a lengthened residence in India, quoted in Swainson's Observations on the Climate of New Zealand, a small work recently published, giving a condensed view of all the information we possess on the subject.

inclusive, is given by Mr. Scott.[1] As this return seems to have been prepared with considerable care, it is possible, from the proportion which the diseases therein enumerated bear to the general mass, compared with the proportion which the same diseases bear to the whole number under treatment in the military hospitals at other foreign stations, to form an approximation to an estimate of the influence of the climate of Van Diemen's Land. In this comparison we shall confine ourselves principally to diseases of the lungs, which seem to be of rather unfrequent occurrence in that part of Australia.

PLACES.	CASES.	Pneumonia and Pleuritis.	Hemoptisis.	Consumption.	Catarrh.
Hobart Town	Out of 30,102.	516	98	104	1657
	Proportion	1 in 58	1 in 307	1 in 290	1 in 18
Cape of Good Hope	Out of 25,506.	673	55	125	1320
	Proportion	1 in 33	1 in 409	1 in 180	1 in 17
Gibraltar	Out of 58,227.	2543	189	394	5186
	Proportion	1 in 23	1 in 308	1 in 148	1 in 11
Malta	Out of 46,639.	1391	106	235	3041
	Proportion	1 in 34	1 in 440	1 in 198	1 in 15
Ionian Islands . . .	Out of 84,438.	2272	147	339	3401
	Proportion	1 in 37	1 in 574	1 in 249	1 in 25

From the preceding table it will be seen that comparatively fewer cases of pneumonia and pleuritis, hemoptysis and consumption occur in Van Diemen's Land than in any of the other colonies, and that as regards catarrh the proportion of cases also is less, with the exception of the Ionian Islands.

With regard to other diseases, it appears that fevers are exceedingly rare, even compared with the healthy colonies above referred to. Dysentery and dyspepsia very common, and constipation extremely so; while diarrhœa is but little experienced. Affections of the liver, too, are more rare than in any other climate with which we are acquainted, but rheumatism is a disease of great frequency, and also of more than usual severity; and it is very remarkable, that of the 30,102 cases, no fewer than 1134 were from toothache.

Scrofula and glandular diseases are rare. Idiopathic intermittent fever, malignant sore throat, smallpox, measles, scarlet fever, hydrophobia, &c. have not been met with in the colony. Hooping-cough

[1] In regard to the cases comprehended in this summary, it is to be observed, that the greater number of the acute diseases were brought on by intemperance, imperfect clothing, and exposure to wet and cold, and that the greater part of the patients were European convicts, of the most dissolute habits and broken constitutions.

was once introduced, and for a short time extended as rapidly and widely as in England, but gradually became milder, and in a few months disappeared, There have been no epidemics in the colony except on two occasions. The first of these was an epidemic influenza, which carried off many persons infirm from age; the second was an epidemic continued fever. The diseases, both acute and chronic, are generally mild, and of comparatively short duration, and yield easily to the usual remedies.[1]

The frequent and sudden changes of weather in Van Diemen's Land do not appear to be attended with the same hurtful consequences to the health as in other countries; and it is remarked by Mr. Scott that "situations apparently unhealthy are inhabited with the utmost freedom, without injury to the constitution, though in any other country they would probably be attended with inevitable destruction, or, at least, much hazard to human life."

New Zealand.—The New Zealand group consists principally of two large islands, about 800 miles in length and 100 miles in breadth, situated between 48° and 34° of south latitude, and between 166° and 179° east longitude.

Both Islands are intersected in the greater part of their length by a chain of very high mountains perpetually covered with snow; hence the country abounds in streams and rivers.

The northern island of New Zealand appears to be more favoured by nature than the southern; but both enjoy a temperate climate.

The climate, especially of the northern island, is described by all who have visited the country as extremely pleasant and salubrious, and in every respect congenial to the European constitution.

The temperature is never very high in summer, nor very low in winter, so that the annual range is within narrow limits. The following table is deduced from Major Cruise's thermometrical observations made during the autumn, winter, and spring, at various places on the west, north, and east coasts of the northern island, between the river Hokianga and the Thames.

Mths.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	July.
Max.	64.00	66.00	68.00	77.00				74.00	69.00	69.00	68.00	62.00
Min.	48.00	51.00	51.00	58.00				65.00	57.00	50.00	50.00	40.00
Mean	57.62	59.06	60.48	63.41				69.15	63.46	58.80	57.70	52.86

During the period to which the above table applies, viz. from March to November inclusive, 86 days were rainy or showery, 78 days were more or less windy, squally, foggy, dark, or hazy, and 150 days were fine.

[1] A Return of Medical and Surgical Diseases treated at H. M. Colonial Hospital, Hobart Town, Van Diemen's Land, for the Years 1821 to 1831. By James Scott, Esq., Colonial Surgeon.—In the Transactions of the Provincial Medical and Surgical Association, vol. iii. 1835.

The climate of New Zealand appears to be mild, soft, and equable. Unlike New South Wales, it is not subject to drought and hot winds, but is plentifully supplied with rain, which appears pretty equally distributed throughout the year. The coasts are much exposed to high winds.

Scrofula and consumption are said to be prevalent diseases among the natives; rheumatism, cutaneous diseases, and inflamed eyes are also common.

The following is a comparative TABLE showing the Mean Temperature of Places in nearly corresponding Latitudes North and South of the Equator.

PLACES.	Yearly Mean.	Spring.	Summer.	Autumn.	Winter.
Funchal, in 32° 30 North Lat.	64.56	62.20	69.33	67.23	59.50
Malta, in 36° 55 North Lat.	67.50	63.50	78.16	71.00	57.33
Rome, in 41° 52 North Lat.	60.70	57.65	72.16	63.96	48.90
Nice, in 43° 20 North Lat.	59.48	56.23	72.26	61.63	47.82
Sidney, in 34° South Lat.	63.68	65.57	72.14	62.87	57.56
Port Johnston, 34° South Lat.	66.56	66.20	80.06	67.82	52.34
Cape Town, in 34° South Lat.	66.56	65.66	74.30	67.28	58.64
Hobart Town, in 43° S. Lat.	52.34	52.88	62.96	51.44	42.26

These few remarks on the climate of our colonies in the Southern Ocean may, I hope, lead to the farther prosecution of the subject, which is one of great interest. Extended and accurate observations on the topography and climate of these regions will not only afford positive information regarding them, but may correct some of the opinions at present entertained respecting the causes of disease in the more unhealthy parts north of the equator. Some striking differences in the influence of certain localities upon health, have been already observed. It is remarked in "The Statistical Reports on the Health of the Navy," that on the South American station there are land-locked harbours, where, under a powerful sun, ships lie for months, or years, surrounded by a country abounding in marshes and rank vegetation, and all the other circumstances which elsewhere are considered the essential cause of the fevers which prove so destructive of life among Europeans, without the occurrence of a single case of fever; the crews, on the contrary, enjoying good health. Analogous to this is the circumstance above quoted from Mr. Scott's report that in Van Diemen's Land, situations which in other countries are found to exert a prejudicial influence on health, have there no such effect.

II.

MINERAL WATERS.

The influence of climate, in the cure of some of the principal diseases treated of in the foregoing pages, may be so effectually promoted by the use of Mineral Waters, that a few observations on the proper application of these will form an appropriate supplement to this volume. It is not my intention to give here a particular account of the waters which I shall have occasion to notice: on this point the reader will find ample information in the various works published expressly on mineral waters, more especially on those of Germany.

It may be remarked, in the first place, that the diseases in which mineral waters produce the most beneficial effects are those of the organs more immediately concerned in digestion and assimilation. The diseases of the skin, of the joints, of the nervous and uterine systems, in which mineral waters are so efficacious, very generally have their origin in disorder of the digestive apparatus; and the correction of this constitutes in general the first step in the cure.

Disorders of the Digestive Organs.—Although the favourable influence of climate, and a suitable regimen, may allay irritation of the mucous surfaces, and induce a more healthy action of these and of the skin, something more active is often required in protracted and complicated cases of dyspepsia, to excite a freer and more steady action of the liver and other secreting organs connected with digestion. With this view I consider a well-directed course of mineral water very efficacious, and capable of effecting, in many cases, what no other remedy with which I am acquainted can effect. Mineral waters, by increasing the action of the secreting and excreting organs, powerfully contribute to relieve the vessels from the load which oppresses them; and thus often produce the most beneficial effects, not only in restoring the functions of the affected organs, but in improving the condition of the whole system. After a well-directed course of mineral water, the dyspeptic invalid enjoys a degree of activity of body and energy of mind to which he had long been a stranger; and if it be followed up by a residence, during the following winter, in a mild climate, the beneficial effects may be increased and confirmed.

But as it is with every other remedy, so the degree of benefit to be derived from the use of mineral waters, will depend upon their

proper adaptation to the individual case. Besides, it is to be remarked that every case of dyspepsia will not be benefited by mineral waters; on the contrary, many cases would be injured by the mildest of them.

The selection of the particular water must depend upon the peculiar nature of the derangement and degree of susceptibility of the digestive organs, and upon the secondary disorders which may have been induced in other parts of the system.

When the mucous surfaces are in a state of irritation, and the liver and abdominal venous system generally, are in a congested state, or when the functions of the uterus are defective, and there is not much relaxation of the system, the mineral waters of *Ems*, of *Vichy*, or of *Plombieres*, will be useful, particularly the two first. In cases where the skin is in an unhealthy state, or where dyspepsia is complicated with chronic bronchial disease, and no objection exists to an elevated, mountainous country, *Cauterets*, among the Pyrenees, will deserve a preference.

When the abdominal viscera are in a more obstinately congested and torpid state, and when there does not exist much irritation of the mucous surfaces, the waters of *Marienbad*, *Carlsbad*, and *Kissingen*, will be more useful than any of these. When the digestive organs are easily excited, and a full action on the bowels is required, the cold aperient waters of Marienbad are indicated; when the digestive organs are in a languid state, the more exciting waters of Kissingen will be preferable. The Carlsbad water, in its operation on the animal economy, may be considered as holding a medium place. In some cases, a course of the *Ems* water may precede these with great advantage. When a state of atony of the stomach exists with general nervous debility; or when the uterine system is debilitated and relaxed, without there being any organic disease, a cold chalybeate water, such as that of *Pyrmont*, or *Schwalbach*, will be very useful, and, in many cases, still more so, if preceded by a course of Kissingen water. The internal use of the two former is often advantageously combined with a course of warm bathing in the same. But to derive essential benefit from this class of waters, the digestive organs must be free from irritation, and the vascular system not in a state of plethora. In many cases a course of bathing at *Ems* forms a good preparative for the internal use of a chalybeate water.

All these waters, at the same time that they are used internally, may generally be employed in the form of bath with great advantage. The temperature, the duration and repetition of the bath can be directed only by the physician residing at the place; and the same observation applies to the duration of the course, the quantity of water to be drunk, &c.

A short course of a cold chalybeate water may be employed very advantageously, in many cases, with the view of giving tone to the system, and confirming the effects of the deobstruent waters. When it is desirable to keep up some action on the bowels, the waters of

Eger will answer well; when the purely tonic effects of the waters are desired, those of Schwalbach or Pyrmont will be preferable.

From a well-directed course of one or more of these waters, the dyspeptic invalid will, I believe, derive all the advantage which is to be obtained from this class of remedies.

After the use of mineral waters, a residence for some time in a bracing air, or by the sea-side, will be very beneficial. When the intention is to pass the winter in Italy, the journey, if well conducted, is not likely to interfere with the good effects of the waters; but rapid traveling should be avoided, and whatever is likely to excite or heat the system.

Bronchial Diseases.—There are several mineral waters on the Continent which have a high reputation in this class of diseases. *Ems* on the Rhine, *Bonnes* and *Cauterets* among the Pyrenees, and *Mont d'Or* in Auvergne, are held in great estimation. A residence during one or two winters in Italy, and a course of one or other of these waters, according to the nature of the case, during the summer, afford, I believe, the most effectual means we possess in the more obstinate and deeply rooted cases of bronchial disease.

The selection of the particular mineral water must depend on the nature of the case. Where the bronchial disease is accompanied with much general delicacy of constitution, and is connected with a congested state of the abdominal circulation, *Ems* deserves the preference. In cases of less delicacy, and those especially in which a mountain air promises benefit, or where the bronchial disease is complicated with chronic cutaneous eruptions, *Bonnes*, or *Cauterets*, will be more effectual. In cases where there exists a very torpid state of the system, and especially a languid or defective action of the skin, or where the occurrence of the bronchial disease has coincided with the disappearance of any cutaneous eruption, the system of bathing adopted at *Mont d'Or* will, I believe, effect cures where the other waters fail.

When the bronchial disease is consequent upon abdominal congestion and disorder of the digestive organs, a course of the Ems waters, followed by those of Carlsbad, Marienbad or Kissingen, as the case may indicate, will prove the most efficacious combination; and a short course of chalybeate water will in some cases give permanency to the effects of the other waters.

Asthma.—When treating of asthma in the first part of this work, it was remarked that when the disease is complicated with chronic irritation of the bronchial membrane, or of the digestive organs, or with a congestive state of the hepatic system, or an unhealthy condition of the skin, a course of warm mineral water will prove of much benefit.

There is more difficulty, however, in selecting a mineral water for the asthmatic patient than for any other, as the source, most suitable in other respects, may be in a situation which decidedly disagrees with the asthma. However well suited the waters of the Pyrenees, or of Mont d'Or, might be as regards the bronchial

disease, it would be useless to propose a residence at either of those places, to an asthmatic invalid who could not breathe at a great elevation, or to send him to Ems or Carlsbad, who could not live in a valley, although their waters might be admirably adapted to the bronchial or abdominal diseases, with which the asthma is complicated. I need not repeat here what I have already stated, regarding the use of the mineral waters, under the heads of Dyspepsia and Bronchial diseases.

When asthma is complicated with disease of the heart, the use of mineral waters is inadmissible, and might be productive of serious injury. This point should always be carefully ascertained before mineral waters are prescribed in asthma.

Gout.—The waters of Ems, of Carlsbad, of Marienbad, of Aix-la-Chapelle, and of Wiesbaden, here deserve particular mention.

Used internally, the waters of Ems and Carlsbad are well calculated to benefit the gouty constitution. The soothing effects of the former prove an excellent preparative, in many cases, for the more exciting but more deobstruent waters of the latter; and these again may often be advantageously followed by bathing and the application of the douche at Wiesbaden, or Aix-la-Chapelle; more especially when frequent attacks of the disease have left the joints stiff and swollen.

Before prescribing a course of mineral waters in gout, or indeed in any other disease, it should be ascertained that there is no disease of the heart or large vessels, or other organs in the chest; and also that there is no disposition to cerebral congestion.

Rheumatism.—Climate and mineral waters are very efficient remedies in chronic rheumatism. The baths of *Aix*, in Savoy, have long enjoyed a high character in obstinate cases of this disease. The waters of *Cauterets* and *Bagneres-de-Luchon*, among the Pyrenees and those of Aix-la-Chapelle are very beneficial, especially when the rheumatism is complicated with cutaneous affections. When the disease, however, is symptomatic of a deranged state of the digestive organs, a course of mineral water, calculated to remove this, will be more beneficial than any waters directed to the affection of the joints only. The cold sulphureous waters are often extremely useful in chronic rheumatism; and as one of the best of the class in this country, I may mention Strathpeffer, in Ross-shire.

FACTITIOUS MINERAL WATERS.

As many persons, in whose complaints mineral waters are indicated, must find it inconvenient to take a course of them at their sources, it may not be irrelevant to our present subject to say a few words respecting the Factitious Mineral Waters introduced into this country by the late Dr. Struve of Dresden. When in Germany, I made particular inquiries regarding the estimation in which these waters were held by the physicians of the different

cities in which Dr. Struve had establishments. The information which I obtained, more especially at Berlin, where these factitious waters are extensively employed, was invariably in favour of their decided utility; and the remarkable similarity of their effects to those of the natural waters was generally admitted. The respectability of Dr. Struve, and his skill as a chemist, were also universally acknowledged.

After such satisfactory information, obtained from physicians of the highest character in Germany, I had no hesitation in prescribing the waters of the German Spa at Brighton in the same cases in which I should have recommended a course of the natural waters of Ems, Carlsbad, &c., had not the distance of these places presented obstacles to their employment. I have had abundant experience of the beneficial effects of Dr. Struve's waters in the diseases which are treated of in this work. And I feel satisfied that when their effects are more generally known to the profession, and the manner of using them better understood, they will be extensively and beneficially employed in a numerous class of diseases, and especially in disorders of the digestive organs, &c. At the same time, if the patient could conveniently take a course of the natural mineral water at its source, I should decidedly prefer this.

In one respect, however, the patient has an advantage in taking the factitious mineral waters, as they may be changed according to the circumstances of the case during the progress of the course. For example, in many cases it will be very desirable to begin with a mild water, such as that of Ems, of Salzbrunnen, or of Saratoga, as a preparative for the more active and more exciting waters of Marienbad, of Carlsbad, and Kissingen; and these again may be succeeded by a short course of the chalybeate waters of Eger, of Pyrmont, or of Spa.

The warm sea-water bath will in the greater number of cases, promote the beneficial action of the waters; and at Brighton this can be had very conveniently. The effects of the dry bracing air of this place will also contribute, more especially in relaxed constitutions, to the salutary operation of the waters.

TABLE I.—SHOWING THE MEAN TEMPERATURE FOR EACH MONTH, EACH SEASON, AND FOR THE WHOLE YEAR.

BRITISH CLIMATES.

NAMES OF THE PLACES.	Mean Annu Temp	Mean Tem of Seasons. Win	Spr.	Sumr.	Autm	MEAN TEMPERATURE OF EACH MONTH. Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Penzance, 1. (A.)	51.80	44.03	49.63	60.20	53.36	42.50	43.50	46.40	48.50	54.00	58.50	61.20	60.90	57.60	53.70	48.80	46.10 *
Sidmouth, 2.	52.10	40.43	50.66	63.83	53.50	36.30	42.00	45.00	51.00	56.00	61.00	65.50	65.00	61.50	53.00	46.00	43.00 ¶
Torquay, 3.	. .	39.31	50.83	. .	. .	37.07	41.02	47.43	50.13	54.94	59.08	63.64	. .	. .	. .	. .	39.84 §
Undercliff, 4. (A.)	51.11	42 14	49.26	60.28	52.76	41.83	41.81	44.50	48.68	54.61	59.08	59.49	62.28	57.30	52.58	48.40	42.80 *
Hastings, 5.	51.00	40.11	45.77	60.45	51.00	38.11	39.88	39.89	44.88	52.55	58.86	60.88	61.61	57.23	51.34	44.44	42.34 *
Chichester, 6.	49.50	38.85	47.76	60.78	50.64	36.46	40.56	41.22	49 29	52.78	59.12	62.22	61.02	58.67	50.54	42.72	39.54 ¶
Gosport, 7.	50.24	40.44	47.63	62.00	50.88	40.44	40.94	42.94	47.00	53.00	61.00	63.00	62.00	58.00	50.20	44.45	38.94 ¶
London, 8. (A.)	50.39	39.12	48.76	62.32	51.35	37.36	40.44	42.64	48.00	55.64	60.00	63.43	63.52	58.80	51.78	43.47	39.58 *
Chiswick, 9.	50.50	39.30	49.33	62.36	51.03	36.50	40.70	43.50	48.80	55.70	60.80	64.00	62.30	57.60	51.80	43.70	40.70 *
Bushey Heath, 10.	49.82	38.62	47.06	61.48	51.46	37.95	38.60	40.10	47.60	53.50	59.15	64.20	61.10	59 60	50.70	44.10	39.30 ¶
Oxford, 11.	48.64	37.00	47.10	60.30	50.00	36.90	37.10	42.10	46.70	52.70	58.70	61.60	60.80	57.10	49.40	43.60	37.00 §
Cheltenham, 12.	51.32	40.60	50.28	64.32	50.96	38.25	41.75	46.18	50.50	54.16	61.50	66.33	65.12	59.06	50.32	43.50	41.75 ¶
Bristol, 13. (A.)	51.60	41.75	49.55	62.74	52.36	42.07	42.64	44.11	48.24	56.30	62.34	63.55	62.34	58.89	51.09	47.11	40.55 *
Helston, (Cornwall,) 14.	52.58	44.51	50.12	62.37	53.88	42.49	44.10	44.58	49.67	56.12	59.95	64.40	62·78	60.48	53.00	48.18	46.94 §
Exeter, 15.	51.40	42.00	49.70	61.90	51.90	40.80	43.00	45.30	48.50	55.50	60.00	63.60	62.00	57.30	52.50	46.00	42.30 *
New Malton, (Yorkshire,) 16	47.65	37.79	44.90	59.44	48.65	36.25	38.44	38.51	45.13	51.08	56.40	62.43	59.50	56.06	47.40	42.48	38.70 §
Alderley, (Cheshire,) 17. (A.)	46.80	37.58	45.80	57.10	48.26	36.75	38.50	41.00	45.10	51.30	56 45	57.75	57.20	54.30	48.10	42.40	37.50 ¶
Kendal, 18.	46.22	36.16	43.79	57.33	46.53	34.88	38.50	38.19	43.21	50.99	55.80	58.10	58.21	52.70	46.29	40.59	35.10 §
Bute, 19.	48.25	39.62	46.66	58.02	48 59	38.42	39.59	41.56	45 80	52.64	57.06	59.22	57.78	53.52	49.18	43.09	40.85
Leith, 20. (A.)	48.36	40 59	45.75	58.27	48.90	41.09	40.62	40.86	46.37	50.01	56.09	60.36	58.37	56.31	49.22	41.19	39.77 §
Edinburgh, 21. (A.)	47.31	39.40	44.70	57 30	47.86	40.17	39.54	39.60	45.84	48.67	54.85	59.31	57.74	55.61	48.37	39.60	38.50 ¶
Elgin, 22.	48 27	36.89	49.67	60.08	46 85	35.65	36.61	41.72	45.06	52.24	59.14	61.69	59.42	54.32	46.79	39.45	38.42 ¶
Kinfauns, 23.	47.02	39.82	44.60	56.82	46.80	41.25	39.85	38.65	45.17	49.96	55.61	58.39	56.48	53.43	46.38	40.58	38 35 ¶
Cove of Cork, 24.	51.58	43.90	49.43	61.26	51.73	43.50	44.40	45.40	48.20	54.70	60.20	61.90	61.70	56.80	51.60	46.80	43.80 *
Dublin, 25.	49 10	39.20	47.30	59.54	50.00	35.42	. .	. .	. .	. .	. .	61.16	. .	. .	. .	. .	. . §
County of Antrim, 26.	47.87	36.75	46.75	58 16	49.83	32.00	38.75	41.25	49.75	49.25	53.75	60.75	60.00	54.25	51.50	43.75	39.50 §
Jersey, 27.	53.06	43.82	50.97	62.84	54.63	41.58	44.62	45.75	50.09	57.08	61.31	63.50	63.72	59.82	55.65	48.42	45.27 *
Isle of Man, 28.	48.96	40.86	46.30	57.56	50.89	39.65	40.56	42.62	45.43	51.25	56.09	59.12	58.81	55.15	51.34	46.18	42.84 ¶

* Register Thermometer. ¶ Common Thermometer. § Doubtful.

TABLE I.—*Continued.*

FOREIGN CLIMATES.

NAMES OF THE PLACES.	Mean Annu Temp	Mean Tem. of Seasons.				MEAN TEMPERATURE OF EACH MONTH.											
		Win.	Spr.	Sumr.	Autm	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Geneva, 29. (A.)	49.89	33.83	48.90	64.99	50.97	32.00	35.50	41.50	47.20	58.00	62.70	66.56	65.70	59.70	50.70	42.50	34.00
Paris, 30. (A.)	51.50	38.43	50.40	64.47	52.30	35.60	40.50	43.50	49.60	58.10	62.50	65.70	65.20	60.40	52.40	44.20	39.20
Nantes, 31.	55.62	42.23	53.10	70.73	56.41	40.36	43.37	44.37	52.42	60.57	69.62	73.80	69.85	65.85	55.25	50.31	45.60
Bourdeaux, 32.	56.48	42.08	56.46	70.88	56.30	41.00	....	....	....	....	....	73.04	....	....	....	....	....
Pau, 33. (A.)	54.95	41.79	54.96	67.41	55.64	38.89	44 96	46.80	55.79	62.31	62.31	71.73	68.19	65.80	54.34	46.79	41.53
Montpelier, 34.	57.60	44.20	53.33	71.30	61.30	42.00	45.00	47.00	53.00	60.00	67.00	72.00	75.00	71.00	61.00	52.00	46.00
Avignon, 35. (A.)	58.20	42.60	57.13	74.66	59.00	42.00	43.50	50.50	55.00	66.00	72.00	76.00	76.00	67.00	60.00	50.00	43.30
Marseilles, 36. (A.)	59.50	45.50	57.56	72.50	60.08	44.80	45.06	49.07	....	....	....	....	....	....	58.20	50.40	46.60
Toulon, 37.	59.90	43.30	53.70	74.30	59.00	40.00	44.00	48.00	55.00	68.00	70.00	74.00	79.00	64.00	62.00	51.00	46.00
Nice, 38. (A.)	59.48	47.82	56.23	72.26	61.63	45.85	49.00	51.45	57.00	63.00	69.00	73.50	74.30	69.35	61.85	53.70	48.60
Genoa, 39.	60.37	44.57	58.60	75.03	62.94	41.65	47.47	51.07	60.30	64.45	73.50	75.10	76.50	73.20	64.70	51.05	45.60
Leghorn, 40. (A.)	60.00	46.30	57.60	74.10	62.00	43.50	45.90	51.70	56.80	64.30	70.60	75.80	76.00	74.80	58.20	53.20	47.70
Naples, 41. (A.)	61.40	48.50	58.50	70.83	64.50	46.50	48.50	52.00	57.00	66.50	71.00	75.00	76.50	72.50	65.00	54.50	50.50
Malta, 42.	67.50	57.33	63.50	78.16	71.00	56.50	56.50	58.50	63.00	69.00	74.00	79.00	81.50	77.50	70.50	65.00	59.00
Mediterranean, gen. tem. of, 43	67.11	57.63	65.50	76.25	69.10	57.23	57.60	62.64	63.88	70.00	72.08	76.63	80.05	75.28	69.71	62.31	58.05
Corfu, 44.	65.55	54.28	59.85	77.09	70.97	52.57	51.85	54.57	58.28	66.71	72.28	77.71	81.28	78.28	70.85	63.78	58.42
Baths of Lucca, 45.	55.00	....	....	68.17	....	....	....	....	53.00	60.50	63.00	70.00	71.50	66.00	....	....	....
Camajore, (Lucca,) 46. (A.)	58.07	44.70	56.32	71.66	59.58	43.60	45.00	50.00	55.70	63.25	68.25	74.00	72.75	67.75	59.50	51.50	45.50
Sienna, 47.	55.60	40.50	54.10	70.80	57.10	39.70	40.22	46.20	53.70	62.40	67.50	72.80	72.30	66.00	58.30	47.10	41.70
Florence, 48.	59.00	44.30	56.00	74.00	60.70	41.00	45.00	48.00	56.00	64.00	69.00	77.00	76.00	70.00	59.00	53.00	47.00
Pisa, 49.	60.60	46.03	57.20	75.15	62 80	44.00	48.11	51.52	56.30	63.75	70.50	77.50	77.50	73.50	62.62	52.30	47.00
Rome 50. (A.)	60.70	48.90	57.65	72.16	63.96	47.65	49.45	52.05	56.40	64.50	69.17	73.30	74.02	69.50	63.60	58.80	49.62
Cadiz, 51.	62.88	52.90	59.53	70.43	65.35	51.40	53.73	55.21	59.64	63.75	68.16	70.27	72.86	70.17	67.10	58.80	53.58
St. Michael's, (Azores,) 52.	62.40	57.83	61.17	68.33	62.33	59.00	59.00	59.50	61.00	63.00	67.00	68.00	70.00	68.00	63.00	56.00	55.60
Madeira, 53. (A.)	64.56	59.50	62.20	69.33	67.23	59.50	58.50	61.06	62.50	63.00	65.00	70.00	73.00	71.50	67.50	62.70	60.50
Santa Cruz, (Canaries,) 54.	70.94	64.65	68.87	76.68	74.17	63.84	64.29	67.17	67.32	72.12	73.89	77.27	78.89	77.43	74.66	70.43	65.82
Cairo, 55.	72.17	58.52	73.58	85.10	71.48	58.10	56.12	64.58	77.90	78.26	83.66	85.82	85.82	79.16	72.32	62.96	61.34

TABLE II.—Showing the difference between the mean temperature of each season and of each month.

Names of the places.	Annual Mean Temperature.	Difference of the Mean Temperature of Winter and Summer.	Difference of the Mean Temperature of warmest and coldest months.	Mean Difference of Successive Months.	Difference of the successive seasons.				Difference of the successive months.											
					Of Winter and Spring.	Of Spring and Summer.	Of Summer and Autumn.	Of Autumn and Winter.	Of January and February.	Of February and March.	Of March and April.	Of April and May.	Of May and June.	Of June and July.	Of July and August.	Of August and September.	Of September and October.	Of October and November.	Of November and December.	Of December and January.
London,	50.39	23.20	26.17	4.36	9.64	13.56	11.00	12.22	3.08	2.20	5.36	7.64	4.36	3.43	0.10	4.73	7.00	8.31	3.89	2.22
Environs of London,	48.81	23.60	28.24	4.87	10.86	12.74	11.67	11.93	5.62	1.73	5.38	9.90	2.87	3.74	1.05	5.13	6.00	9.31	3.27	3.50
Undercliff,	51.11	18.14	20.47	3.41	7.12	11.02	7.52	10.62	0.02	2.69	4.18	5.93	4.47	0.41	2.79	4.98	4.72	4.18	5.60	0.97
Edinburgh,	47.31	17.90	20.81	3.65	5.30	12.60	9.44	8.46	0.63	0.06	6.24	3.17	6.18	4.48	1.57	2.13	7.24	8.77	1.10	1.67
Leith,	48.36	17.68	20.59	3.52	5.16	12.52	9.37	8.31	0.47	0.24	5.51	3.64	6.08	4.27	1.99	2.06	7.11	8.03	1.42	1.32
Bute,	48.25	18.40	20.80	3.46	7.01	11.39	9.43	8.97	1.17	1.97	4.24	6.84	4.42	2.16	1.44	4.26	4.34	6.09	2.24	2.43
England generally,	49.51	21.69	24.54	4.38	8.50	12.91	10.71	11.33	3.04	2.18	4.31	9.18	5.23	2.84	1.00	4.07	6.70	6.75	4.65	2.70
Scotland,	46.36	18.88	21.72	3.52	6.36	12.46	10.03	8.81	0.46	0.45	5.53	4.86	5.86	3.36	1.93	3.14	6.36	7.01	2.59	1.65
County of Antrim,	47.87	21.39	28.75	4.87	10.00	11.41	8.33	13.08	6.75	2.50	8.50	0.50	4.50	7.00	0.75	5.75	2.70	7.75	4.25	7.50
Cove,	51.58	17.36	18.40	3.06	5.53	11.83	9.53	7.83	0.90	1.00	2.80	6.50	5.50	1.70	0.20	4.90	5.20	4.80	3.00	0.30
Kendal,	46.22	21.17	23.33	3.94	7.63	13.54	10.80	10.37	3.62	0.31	5.02	7.78	4.81	2.30	0.11	5.51	6.41	5.70	5.49	0.22
Geneva,	49.89	31.16	34.56	5.76	15.7	16.09	14.02	17.14	3.50	6.00	5.70	10.80	4.70	3.86	0.86	6.00	9.00	8.20	8.50	2.00
Paris,	51.00	25.83	29.50	4.91	12.00	13.90	11.00	14.83	4.50	2.80	5.20	10.00	3.00	4.00	0.50	5.90	7.00	7.00	8.00	2.00
Penzance,	51.80	16.17	18.70	3.11	5.60	10.57	6.84	9.33	1.00	2.90	2.10	5.50	4.50	2.70	0.30	3.30	3.90	4.90	2.70	3.60
Southwest of France,	55.29	26.42	30.87	4.47	12.08	14.59	12.74	14.00	4.55	1.45	8.52	7.33	4.52	6.80	3.72	3.22	11.08	6.27	5.27	3.94
Southeast of France,	58.82	29.26	35.33	5.66	11.66	17.75	13.36	16.7	2.19	4.25	5.83	10.33	5.00	4.33	2.66	9.33	6.33	8.96	5.37	3.40
Nice,	59.48	23.57	28.22	4.70	9.50	14.52	10.01	13.60	3.07	2.72	4.20	7.40	5.00	4.25	2.00	4.00	9.50	7.00	5.05	2.90
Italy,	59.46	27.56	32.10	5.75	11.53	16.03	11.33	16.70	3.50	4.33	6.21	7.63	5.80	5.12	0.82	4.30	9.53	9.06	5.85	3.40
Madeira,	64.56	9.83	14.50	2.41	2.70	7.13	2.10	7.73	1.00	2.56	1.44	0.50	2.00	5.00	3.00	1.50	4.00	4.80	2.20	1.00
Santa Cruz,	70.94	12.03	15.05	2.51	4.22	7.81	2.51	9.52	0.45	2.88	0.15	4.80	1.77	3.38	1.62	1.46	2.77	4.23	4.61	2.00
Cairo,	72.17	26.58	27.72	5.50	15.06	11.58	13.62	13.00	2.00	8.46	13.32	0.36	5.40	2.16	0.00	6.66	6.84	10.64	1.61	3.24

TABLE III.—Containing the annual and monthly ranges of temperature.

Names of the places.	Mean Annual Temperature.	An. Range.			Mean of the Monthly Ranges.	January			February			March			April			May			June			July			August			Sept.			October			Novem.			Decem.		
		Range.	Max. of Year.	Min. of Year.		Rng.	Maximum	Minimum	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.	Rng.	Maximum	Minim.
London, 8. (B.)	50.39	*64	86	22	*34	28	50	22	27	52	25	32	61	29	37	69	32	39	75	36	48	86	38	33	77	44	38	82	44	35	75	40	33	65	32	30	57	27	30	54	24
Alderly, 17. (B.)	46.80	*58	76	18	*34	32	50	18	30	52	22	35	58	23	39	66	27	39	71	32	37	76	39	31	74	43	32	74	42	37	73	36	30	62	32	31	56	25	32	51	19
Environs of London, 8*a*. (A)	48.81	*67	83	16	*38	33	49	16	35	54	19	36	60	24	43	69	26	45	78	33	41	80	39	42	83	41	37	79	42	41	75	34	38	68	30	34	56	22	33	53	20
Gosport, 7.	50.24	*66	80	14	*31	34	54	20	42	56	14	28	60	32	35	70	35	32	72	40	30	75	45	27	80	53	29	77	48	24	73	49	33	68	35	35	62	27	26	57	31
Cheltenham, 12.	51.32	*60	85	25	*31	25	50	25	23	53	30	33	61	28	36	68	32	35	71	36	36	79	43	38	85	47	33	81	48	31	74	43	30	65	35	28	57	29	27	55	28
Undercliff, 4. (B.)	51.11	*55	81	26	*28	25	52	27	24	52	28	31	57	26	37	70	33	38	74	36	27	74	47	23	71	48	31	81	50	29	73	44	26	65	39	23	57	34	27	53	26
Sidmouth, 2.	52.10	*53	74	21	*30	26	47	21	25	52	27	30	56	26	29	60	31	28	66	38	32	73	41	32	74	42	32	74	42	32	71	39	33	64	31	30	57	27	29	54	25
Penzance, 1. (B.)	51.80	*49	76	27	*23	25	53	28	23	54	31	24	58	34	26	62	36	26	67	41	25	71	46	23	73	50	21	71	50	22	68	46	22	63	41	21	57	36	22	55	33
Cove, 24.	51.58	47			*26	23	53	30	21	54	33	28	59	31	28	61	33	31	69	38	27	73	46	28	76	48	26	74	48	27	70	43	28	63	35	23	57	34	24	54	30
Bute, 19. (B.)	48.25	60	80	20	31	29	49	20	31	51	20	26	54	28	31	60	29	34	69	35	33	74	41	35	80	45	39	80	41	33	69	36	29	60	31	27	54	27	23	51	26
Pau, 33.	54.95	68	89	21	28	35	56	21	25	60	35	30	65	35	28	71	43	29	80	51	28	80	52	30	89	59	24	82	58	30	82	52	24	70	46	25	64	39	31	56	25
Montpelier, 34.	57.60	59	86	27	23	26	53	27	25	55	30	23	58	35	23	64	41	22	71	49	24	80	56	23	85	62	21	86	65	20	75	55	23	71	48	22	62	40	25	57	32
Nice, 38.	59·48	60	87	27	21	31	58	27	21	58	37	24	65	41	23	69	46	26	77	41	20	78	58	15	81	66	18	87	69	21	82	61	22	70	48	18	61	43	19	59	40
Rome, 50.	60.70	62	91	29	28	29	58	29	27	60	33	28	65	37	30	74	44	28	80	52	28	88	60	27	91	64	29	91	62	30	85	55	31	77	46	28	67	39	29	60	31
Naples, 41.	61.40	64	93	29	29	29	58	29	29	60	31	31	69	38	35	78	43	35	86	51	32	88	56	29	93	64	29	91	62	28	88	60	28	79	51	20	64	44	27	61	34
Madeira, 53. (B.)†	68.89	23	77	54	12	12	68	56	11	68	57	13	67	54	13	71	58	15	75	60	14	76	62	12	77	65	10	77	67	11	77	66	11	76	65	12	71	59	11	69	50
Idem, (?)	64.56	*35	85	50	*18	19	69	50	17	68	51	18	69	51	17	27	55	20	75	55	15	85	73	13	76	63	17	82	65	21	85	64	19	77	58	20	72	52	16	68	52

* The observations made in England, as denoted by the asterisk, were made with the register thermometer, and consequently, give a much greater range there than abroad, where, with the exception of Madeira, the observations are confined to the day.

TABLE IV.—Containing the daily range of temperature.

Names of the places.	Annual Mean Tem.	Range of daily Temp. for the year.		January		Feb.		March		April		May		June		July		August		Sept.		October		Novem.		Decem.	
		Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range.	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range	Mean daily Range	Extreme daily Range
London, 8. (c.)	50.39	*11	—	7	—	9	—	11	—	13	—	16	—	18	—	16	—	7	—	13	—	11	—	8	—	7	—
Leith, 20. (b.)	48.36	6	—	3	—	4	—	6	—	10	—	8	—	8	—	10	—	8	—	8	—	5	—	4	—	2	—
Alderley, 17. (c.)	46.80	6.6	—	5	—	6	—	8	—	9	—	8	—	7	—	6	—	6	—	8	—	6	—	6	—	4	—
Env. of Lond. 8 *a* (b)	48.81	*15	—	9	—	12	—	14	—	19	—	19	—	20	—	19	—	18	—	18	—	15	—	11	—	10	—
Chiswick, 9.	....	*15	—	9	—	7	—	12	—	17	—	18	—	17	—	23	—	24	—	18	—	16	—	12	—	9	—
Gosport, 7.	50.24	6.1	*25	6	18	7	21	6	24	7	22	5	21	6	24	7	25	7	23	7	24	5	21	5	19	5	17
Undercliff, 4.	51 11	10	—	7	—	7	—	10	—	14	—	14	—	12	—	9	—	11	—	8	—	9	—	7	—	7	—
Sidmouth, 2.	52.10	....	16	—	13	—	12	—	12	—	13	—	11	—	16	—	10	—	9	—	11	—	15	—	11	—	13
Penzance, 1. (c.)	51.80	6.7	—	4	—	6	—	8	—	9	—	9	—	8	—	8	—	8	—	7	—	6	—	5	—	3	—
Bute,†	49.29	*9	26	6	15	7	15	9	21	11	21	14	25	13	26	12	25	13	25	11	23	8	20	7	14	6	11
Cove, 24.	51.58	10.10	—	6	—	7	—	11	—	12	—	11	—	14	—	13	—	12	—	10	—	8	—	7	—	5	—
Geneva, 29. (b.)	49.89	12.5	—	7	—	10	—	13	—	15	—	16	—	16	—	16	—	17	—	14	—	11	—	8	—	7	—
Nantes, 31.	55.62	5.7	—	3	—	4	—	5	—	8	—	3	—	6	—	10	—	7	—	9	—	6	—	4	—	4	—
Pau, 33. (b.)	54.95	7.6	20	7	16	9	16	9	17	8	18	10	16	8	15	8	20	5	14	7	14	5	14	8	15	7	13
Montpelier, 34.	57.60	12.0	—	8	—	9	—	14	—	14	—	14	—	15	—	15	—	17	—	13	—	12	—	10	—	9	—
Avignon, 35. (b.)	58.20	12.5	—	8	—	8	—	10	—	12	—	15	—	19	—	19	—	17	—	15	—	12	—	8	—	7	—
Nice, 38. (b.)	59.60	8.5	18	8	16	9	18	9	17	11	18	10	16	8	14	10	15	11	12	8	16	7	16	6	17	6	14
Camajore, 46.	58.07	10.8	—	7	—	9	—	10	—	11	—	12	—	14	—	14	—	13	—	12	—	11	—	7	—	6	—
Sienna, 47.	55.60	15.0	—	11	—	14	—	16	—	19	—	21	—	17	—	17	—	17	—	16	—	14	—	11	—	10	—
Rome, 50. (b.)	60.70	11.0	20	11	16	10	18	12	19	10	20	10	17	9	16	11	16	13	18	12	17	14	20	10	17	9	15
Naples, 41. (b.)	61.40	13.3	23	9	14	11	19	11	18	14	20	17	21	16	22	16	23	17	21	15	21	14	18	11	14	9	13
Madeira, 53. (c.)	64.56	*10.0	17	11	17	9	13	10	14	9	13	8	11	8	10	10	12	12	15	16	17	10	16	10	15	11	14

* The asterisk indicates where the observations were made by a register thermometer, and thus give the range of night and day; the others of the day only.

† As regards Bute, the asterisk indicates that the observations give the whole range of the twenty-four hours, as registered hourly night and day.

TABLE V.—Variations of temperature between each successive day, for each month and for the whole year.

		London, 8. D	Chiswick, nr. London,) (9,	Under-cliff, 4.	Penzance, 1. (D.)	Bute.	Cove, 24.	Pau- 33. (c.)	Nice, 38. (c.)	Florence, 48.	Leghorn, 40.	Rome, 50. (c.)	Naples, 41. (c.)	Madeira, 53. (D.)
Mean Annual Temperature,		50.39	50.50	51.11	51 80	49.29	51.58	54.95	59.48	59.00	60.00	60.70	61.40	64.53
Varns. for the year.	Mean Variation of successive days	4.01	4.03	3.75	2.68	3.59	2.2	3.55	2.33	2.90	2.44	2.80	3.26	1.11
	Mean of the Extreme Variations, Rise	14.33	16.00		8.64	12.75	6.0	8.90	6.22	7.60	8.10	8.20	7.02	5.00
	Mean of the Extreme Variations, Fall	14.83	14.40			12.41		10.90	7.26	8.01	7.74	8.60	8.69	5.40
	Absolute Extreme Variations, Rise	18.00	22.00		10.00	16.00	8.5	10.50	11.20	10.00	12.00	13.80	8.80	8.00
	Absolute Extreme Variations, Fall	21.00	18.00			15.00		13.50	12.25	11.00	12.80	15.30	10.75	8.00
January	Mean Variation	5.10	3.80	3.37	3.74	3.47	2.9	3.84	2.60	3.30	3.43	3.03	2.80	1.83
	Greatest Rise	16.00	14.00		10.50	15.00	8.0	10.30	8.20	10.00	12.00	9.50	7.50	6.00
	Greatest Fall	15.00	12.00			12.00		10.00	6.40	9.25	12.80	8.40	8.00	8.00
Feeruary	Mean Variation	3.26	4.20	3.31	3.26	5.43	2.3	4.16	3.00	2 60	2.41	3.02	2.80	1.40
	Greatest Rise	12.00	16.00		10.00	15.00	4.3	10.50	11.20	7.30	8.60	8 60	6.60	8.00
	Greatest Fall	8.00	16.00			10.00		9.83	12.25	7.00	8.42	8.20	10.75	5.00
March	Mean Variation	3.38	4.00	3.80	3.15	3.28	2.3	3.42	2.40	3.00	2.10	2.80	4.00	0.90
	Greatest Rise	15.0	18.0		10.5	16.00	7.3	9.83	8.00	9.12	8.40	7.50	6.60	4.00
	Greatest Fall	12.0	16.0			13.00		11.16	8.00	7.50	7.10	8.00	9.50	6.00
April	Mean Variation	4.00	4.40	4.38	2.52	3.09	2.1	4.24	4.00	2 80	3.33	2.82	2.90	1.30
	Greatest Rise	12.0	18.0		8.00	10.60	5.6	9.83	8.40	8.00	8.95	8.40	7.80	5.00
	Greatest Fall	21.0	14.0			15.00		11.66	8.60	8.60	8.90	9.00	8.20	8.00
May	Mean Variation	3.80	3.70	4.19	2.09	3.29	1.6	4.00	2.20	3.00	2.33	2.80	4.00	0.90
	Greatest Rise	17.0	14.0		5.60	11.00	5.5	7.50	4.60	8.00	6.65	7.80	8.35	4.00
	Greatest Fall	13 0	13.0			14.00		13.50	6.40	10.00	5.35	7.20	8.80	5.00
June	Mean Variation	4.04	3.80	4.26	1.61	3.35	1.6	3.76	2.20	2.60	1.30	2.60	3.60	0.80
	Greatest Rise	15.0	13.0		5.60	12.00	3.3	10.30	5.00	9.25	3.70	8.00	7.60	4.00
	Greatest Fall	20.0	12.0			13.00		8.88	7.25	5.50	3.30	8.20	8.80	3.00
July	Mean Variation	3.50	3.70	3 30	1.46	3.26	3.1	4.23	1.50	3.00	2.50	2.40	3.00	0.70
	Greatest Rise	12.0	14.0		5.00	10.00	5.3	10.16	3.50	7.00	10.00	6.90	6.40	0.20
	Greatest Fall	12.0	14.0			14 00		12.80	4.60	11.00	8.00	9.50	8.60	0.30
August	Mean Variation	3.20	3.40	3.59	1.27	3.42	3.1	3.23	1.50	2.15	1.50	2.06	2.40	0.80
	Greatest Rise	15.0	13.0		4.60	15.00	5.1	7.80	4.20	4.00	4.00	8.60	8.80	3.00
	Greatest Fall	14.0	12.0			12.00		10.30	5.25	7.00	4.00	7.25	6.80	5.00
September	Mean Variation	3 50	4.30	3.96	2.55	3.80	1.8	2.91	1.75	2.20	2.67	2.66	2.40	1.23
	Greatest Rise	11.0	16.0		9.20	12.00	6.0	7.66	6.20	5.80	8.00	6.40	6.00	4.00
	Greatest Fall	17.0	14.0			12.00		13.00	6.80	8.05	10.00	8.60	8.40	5.00
October	Mean Variation	4.30	4.90	4.11	3.02	3.51	2.3	2.74	2.60	3.50	2.80	3.00	4.00	1.13
	Greatest Rise	12.0	22.0		9.00	13.00	6.6	6.80	5.25	7.75	10.00	8.00	5.80	3.00
	Greatest Fall	15.0	18.0			12.00		10.50	7.75	8.00	10.00	9.25	8.20	5.00
November	Mean Variation	4.70	4.20	3.46	3.18	3.61	2.4	2.47	1.90	3.75		3.50	1.90	1.10
	Greatest Rise	18.0	17.0		11.25	13.00	8.1	6.80	5.00	6.60		8.80	4.60	6.60
	Greatest Fall	17.0	17.0			12.00		8.66	7.50	8.00		11.60	9.50	6.00
December	Mean Variation	4.80	4.00	3.33	4.41	3.64	2.6	3.67	2.40	2.80	2.45	3.45	3.00	1.23
	Greatest Rise	17.0	16.0		12.50	11.00	6.0	9.33	6.00	8.25	8.90	10.50	8.20	4.00
	Greatest Fall	14.0	15.0			10.00		11.16	6.40	6.25	7.25	9.25	8.60	6.00

TABLE VI.—ACCOUNT OF THE TEMPERATURE EXPERIENCED BY AN INVALID CONFINED TO THE HOUSE AT NICE AND TORQUAY, COMPARED WITH THE TEMPERATURE OF THE EXTERNAL AIR.

	Exposure of Apartments	NOVEMBER.						DECEMBER.						JANUARY.						FEBRUARY.						MARCH.						APRIL.					
		Mean Temperature.	Range of Temperature.			Variation of Tem. of successive days		Mean Temperature.	Range of Temperature.			Variation of Tem. of successive days.		Mean Temperature.	Range of Temperature.			Variation of Tem. of successive days.		Mean Temperature.	Range of Temperature.			Variation of Tem. of succes sive days.		Mean Temperature.	Range of Temperature.			Variation of Tem. of successive days.		Mean Temperature.	Range of Temperature.			Variation of Tem. of successive days.	
			Monthly.	Daily Mean.	Daily Extreme.	Mean.	Extreme.		Monthly.	Daily Mean.	Daily Extreme.	Mean.	Extreme.		Monthly.	Daily Mean.	Daily Extreme.	Mean.	Extreme.		Monthly.	Daily Mean.	Daily Extreme.	Mean.	Extreme.		Monthly.	Daily Mean.	Daily Extreme.	Mean.	Extreme.		Monthly.	Daily Mean.	Daily Extreme.	Mean.	Extreme.
NICE . . Inter. Temp. [Fire only at night.]	SOUTH . .	59.94	13	3	3	1.70	6	60.89	10	4	6	0.93	5	55.28	14	3	6	1.60	5	58.72	9	4	6	1.06	5	62.70	7	2	3	0.79	3	63.40	6	1	2	0.63	2
1826–7. Exter. Temp.	. . . . .	53.70	18	6	17	1.90	8	48.60	19	6	14	2.40	6	45.85	31	8	16	2 60	8	49.00	21	9	18	3.0	12	51.45	24	9	17	2.40	8	57.00	23	11	18	4.00	9
TORQUAY Inter. Temp. [Fire almost constantly.]	NORTH . .	63.90	7	1	4	0.83	3	64.52	6	2	4	0.83	3	63.56	6	1	4	0.78	3	62.60	11	3	7	1.08	4	63.16	9	3	7	0.85	5	64.64	6	2	5	0.76	3
1827–8. Exter. Tem.	. . . . .	49.90	29	5	10	3.50	19	48.36	18	5	12	4.00	14	45.91	25	5	13	3.40	11	45.48	29	6	16	3.45	11	48.20	23	8	13	3.20	18	52.82	26	11	12	2.50	9

TABLE VII.—Showing the range of the barometer for each month and for the whole year.

Names of the places.	Annual Mean Temperature.	Annual Mean Height of Barometer.	Range for the whole Year.	Range for each month.												Names of observers, periods of observation, &c.
				Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
London . .	0.39	*29.895	1.998	1.429	1.350	1.299	1.070	0.914	0.830	0.691	0.759	0.898	1.158	1.458	1.450	Howard, 1806—1816.
Idem . .	....	.....	....	1.600	1.360	1.260	1.110	1.090	0.640	0.790	0.730	0.880	1.380	0.920	1.130	Daniell, 1819—1823.
Edinburgh .	47.31	*29.624	....	1.850	1.700	1.000	0.950	0.900	0.600	0.850	1.250	1.300	1.400	1.150	1.500	Medical Observations, 1734—5.
County of Antrim	47.87	29.530	....	1.400	1.400	1.700	1.100	0.900	0.800	0.700	0.700	1.300	1.200	1.100	1.600	Edinburgh Medical Journal.
Kendal . .	48.03	29.630	2.060	1.190	1.510	1.630	0.710	0.840	0.870	0.760	1.080	1.060	1.260	0.960	1.890	S. Marshall, Esq. 1827 : *Phil. Mag.*
Alderley, Cheshire	46.80	29.460	1.700	1.685	1.355	1.410	1.200	0.965	0.867	0.787	0.875	0.974	1.230	1.395	1.575	Rev. E. Stanley, 1815—1824.
Cheltenham .	51.32	29.627	1.550	1.150	0.910	1.100	1.080	0.630	0.690	0.550	0.810	0.900	1.060	1.210	1.000	Moss, 1825–26.
Gosport . .	50.24	29.900	1.790	0.970	0.950	1.510	0.840	1.000	0.690	0.700	1.030	0.840	1.290	1.120	1.510	Dr. Burney, 1827.
Sidmouth .	52.10	29.964	....	1.410	0.990	1.310	1.000	3.850	0.780	0.790	0.710	0.600	1.240	1.140	1.390	Dr. Clarke, 1812—1814.
Penzance . .	51.80	29.620	1.950	1.360	1.070	1.080	0.940	0.600	0.670	0.763	0.680	0.990	0.940	0.940	1.140	Dr. Forbes, 1818–19.
Bute . .	48.25	29.88	2.51	2.30	1.59	1.43	1.29	1.29	1.11	1.00	1.07	1.13	1.70	1.66	2.38	R. Thom, Esq.
Nantes . .	55.62	*29.830	1.817	1.172	1.376	1.021	1.419	1.110	0.343	0.588	0.532	0.795	1.332	0.706	1.065	Huette, 1824–5.
Montpelier .	57.60	29.747	....	0.917	0.854	0.751	0.588	0.464	0.676	0.464	0.397	0.532	0.706	0.843	0.917	M. Mejan.
Milan . .	55.80	29.579	1.279	0.961	0.958	0.871	0.788	0.614	0.439	0.437	0.435	0.435	0.614	0.871	0.958	L'Abbate Cesaris, 1763—1817.
Genoa . .	....	.....	....	0.706	1.065	0.917	0.532	0.444	0.353	0.588	0.444	0.588	0.588	....	....	J. Fratelli Mojon, 1802.
Florence . .	59.00	29.884	1.508	1.065	0.977	0.588	0.799	0.588	0.397	0.400	0.464	0.751	1.332	0.706	1.065	Ximenian Observatory.
Rome . .	60.70	29.893	1.221	0.843	0 854	0.977	0.676	0.588	0.442	0.397	0.360	0.532	0.676	0.751	0.917	Calandrelli, 1811—1823.
Naples . .	61.40	29.554	1.154	0.888	0.843	0.888	0.710	0.355	0.552	0.266	0.355	0.488	0.532	0.621	0.621	Broschi, 1821—1824.
Madeira . .	64.56	*30.030	1.211	0.618	0.667	0.659	0.482	0.500	0.258	0.373	0.260	0.311	0.427	1.010	6.700	Heineken, 1826.

* The asterisk marks where correction is made for the expansion of mercury by the heat.

TABLE VIII.—Mean quantities of rain, in inches and parts of inches, for each month and the whole year.

Names of the Places.	Mean Annual Temperature.	Mean Annual Quantity of Rain.	Ratio of the Mean Annual Temperature to the Annual Quantity of Rain.	Average Number of Days on which Rain Falls.	Mean Monthly Quantities of Rain. Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Names of Observers, Periods of Observation, &c.
London	50.39	*20.686	2.4350	178	1.464	1.250	1.172	1.279	1.636	1.738	2.448	1.807	1.84[illegible]	2.092	2.222	1.736	Dalton, 40 years.
Idem	....	24.804	2.0315	178	1.959	1.482	1.299	1.692	1.822	1.920	2.637	2.125	1.921	2.522	2.498	2.427	Howard, 20 years.
Edinburgh	47.31	23.500	2.06[illegible]	..	1.090	1.360	0.880	0.990	1.940	2.030	0.860	1.690	2.230	3.460	4.140	2.830	Adie, 1824, 1825.
Kinfauns	47.02	24.060	1.9542	137	1.400	1.200	1.120	1.700	1.500	2.250	1.050	1.850	2.270	3.070	3.600	3.050	Lord Gray, 1824, 1825.
Glasgow	....	21.331	....	..	1.595	1.741	1.184	0.979	1.641	1.343	2.303	2.746	1.617	2.297	1.904	1.981	Dalton, 17 years.
Dumfries	....	36.919	....	..	3.095	2.[illegible]3	2.164	2.017	2.[illegible]68	2.974	3.256	3.199	4.350	4.143	3.174	3.142	Idem, 16 years.
Bute	48.25	38.500	....	157	2.87	3.[illegible]	3.40	1.[illegible]	1.78	2.03	3.00	3.42	3.77	4.32	4.50	4.43	19 years.
Kendal	46.22	53.944	0.8565	176	5.299	5.126	3.151	2.[illegible]8	3.480	2.722	4.959	5.039	4.874	5.439	4.785	6.084	Dalton, 25 years.
Alderney, Cheshire	46.80	32.889	1.4230	188	1.786	2.125	2.843	2.[illegible]	2.559	2.742	3.4[illegible]8	3.153	2.565	3.125	3.205	3.238	E. Stanley, 1815—1824.
Lancaster	....	39.714	....	..	3.461	2.[illegible]	1.753	2.180	2.460	2.512	4.140	4.581	3.751	4.151	3.775	3.955	Dalton, 20 years.
Liverpool	....	34.118	....	..	2.177	1.84[illegible]	1.523	2.104	2.573	2.816	3.663	3.311	3.654	3.724	3.441	3.288	Idem, 18 years.
Manchester	....	36.140	....	..	2.310	2.568	2.098	2.[illegible]1	2.895	2.502	3.697	3.665	3.281	3.922	3.360	3.832	Idem, 33 years.
Chatsworth	...	27.664	....	..	2.196	1.652	1.322	2.07[illegible]	2.118	2.286	3.006	2.435	2.289	3.079	2.634	2.569	Idem, 16 years.
New Malton	47.65	36.740	1.2964	137	1.160	1.220	2.830	2.110	2.270	2.720	1.170	2.850	5.610	6.250	4.380	4.170	Stockton, 1824. Phil. Mag.
Bushey Heath	49.82	30.596	1.5344	..	0.[illegible]49	3.694	1.364	2.133	3.710	3.270	1.729	2.433	5.260	2.862	2.546	2.746	Col. Beaufoy, 1824, 1825.
Isle of Man	48.96	37.650	....	155	3.050	2.740	2.950	2.490	1.400	1.810	1.840	3.030	3.080	4.490	5.220	5.550	R. Stewart, Esq. 1824-28.
Bristol, 13. (B)	51.60	32.560		160	2.120	2.770	2.120	2.040	1.530	3.020	3.480	2.940	2.730	2.880	3.390	3.540	Bristol Institution.
Gosport	50.24	29.965	1.6800	..	1.000	0.820	3.145	1.910	2.125	1.660	1.115	2.060	3.835	4.835	1.835	5.625	Dr. Burney, 1827.
Hastings	51.00	28.340		..	2.270	1.770	1.520	0.900	1.440	1.670	2.370	2.010	3.940	2.700	4.340	3.400	3 and 4 years.
Sidmouth	52.10	27.290	1.9095	135	3.850	2.340	0.500	2.500	1.670	2.030	2.280	1.180	1.750	3.500	1.990	2.700	Dr. Clarke, 1813, 1814.
Undercliff	51.11	26.230			2.210	1.380	1.230	0.770	1.830	1.390	2.840	1.850	3.060	2.860	4.230	2.610	Dr. Martin, 3 years.
Helston	52.58	36.970	....	165	3.300	3.305	3.500	1.970	2.800	2.100	1.800	2.830	3.030	3.800	4.000	4.670	Mr. Moyle, 1821, 1828.
Penzance	51.80	44.715		179	3.775	3.305	3.477	2.985	2.905	2.4[illegible]	3.111	3.800	3.747	4.687	4.918	5.575	Mr. E. Giddy, 12 years.
Cove	51.60	33.299		138	3.578	4.048	1.931	1.294	0.835	2.215	3.142	1.712	2.453	2.270	5.382	2.939	Dr. Scott, 3 years.
Paris	51.00	*18.694	2.7347	..	1.928	1.232	1.190	1.185	1.767	1.697	1.800	1.900	1.550	1.780	1.720	1.600	Dalton, 15 years.
Toulouse	52.50	25.120	2.0900	..													
Montpelier	57.60	29.898	1.9265	82	2.131	1.621	3.730	2.664	2.664	1.250	0.399	0.666	1.621	3.375	4.929	4.841	Poiteven, 1796—1806.
Marseilles	59.50	*15.610	3 2718	55	1.705	0.756	0.852	0.650	0.959	0.756	1.705	0.959	1.833	2.558	1.598	1.270	Blanpain, 10 years.
Toulon	59.90	19.712	3.0387	..	2.131	1.065	1.332	1.598	1.598	0.621	0.355	0.621	2.576	2.753	2.664	2.398	Burel, 33 years.
Turin	53.50	3 .898	1.6000	..	1.508	0.581	2.079	4.319	4.189	4.492	3.592	2.727	2.639	3.408	2.116	1.248	Vassali Eandi, 1803—1818.
Milan	55.80	3 .838	1.4700	..	2.842	2.024	2.306	3.090	3.730	3.197	2.839	3.016	3.197	4.156	4.351	3.090	Cesaris, 1763—1807.
Florence	52.00	*31.087	1.8556	103	3.581	0.991	3.273	2.036	3.485	1.961	1.151	0.660	2.515	3.273	3.678	5.083	Ximenian Observ. 1824-25.
Rome	60.70	*31.173	1.9471	117	4.263	1.687	2.043	1.776	2.486	[illegible].687	1.243	1.243	2.309	5.507	3.375	3.553	Calandrelli, 1811—1823.
Madeira	64.56	25.026	2.5600	73	3.217	1.757	1.510	1.520	1.072	0.347	0.372	0.405	1.067	2.082	8.577	3.100	Dr. Heineken, 1825—1827.

* The Asterisk denotes those places where the rain-guage stood at a considerable height above the ground.

TABLE IX.—Showing the relative prevalence of different kinds of weather for each month, and for the whole year.

Names of the places.	Days on which each particular kind of weather prevails during the year: Fine.	Cldy. or Variable.	Days on wch. any rain falls	Number of days during which the different kinds of weather have prevailed in each month. January: Fine.	Cldy. or Var.	Rain falls.	February: Fine.	Cldy. or Var.	Rain falls.	March: Fine.	Cldy. or Var.	Rain falls.	April: Fine.	Cldy. or Var.	Rain falls.	May: Fine.	Cldy. or Var.	Rain falls.	June: Fine.	Cldy. or Var.	Rain falls.	July: Fine.	Cldy. or Var.	Rain falls.	August: Fine.	Cldy. or Var.	Rain falls.	Sept.: Fine.	Cldy. or Var.	Rain falls.	October: Fine.	Cldy. or Var.	Rain falls.	Novem.: Fine.	Cldy. or Var.	Rain falls.	Decem.: Fine.	Cldy. or Var.	Rain falls.	Names of observers, periods of observation, &c.
London	—	—	178	—	—	14	—	—	16	—	—	13	—	—	14	—	—	16	—	—	12	—	—	16	—	—	16	—	—	12	—	—	16	—	—	15	—	—	18	Howard, 1807–16.
Kinfauns	218	—	147	—	—	8	—	—	10	—	—	11	—	—	9	—	—	10	—	—	9	—	—	7	—	—	12	—	—	15	—	—	18	—	—	11	—	—	17	Lord Gray, 1824–5.
County of Antrim	156	54	155	15	2	14	10	4	14	13	4	14	12	1	17	25	—	6	17	1	12	11	4	16	4	7	20	23	1	6	10	9	12	7	11	12	9	10	12	Edinb. Med. Jour.
Cove	—	—	138	—	—	11	—	—	14	—	—	10	—	—	10	—	—	8	—	—	13	—	—	11	—	—	10	—	—	15	—	—	12	—	—	14	—	—	10	Dr. Scott.
Undercliff 4. (c)	—	—	144	—	—	16	—	—	16	—	—	8	—	—	4	—	—	7	—	—	10	—	—	13	—	—	7	—	—	16	—	—	11	—	—	19	—	—	10	Dr. Martin, 1839–40.
Bristol, 13. (c)	—	—	160	—	—	12	—	—	14	—	—	11	—	—	12	—	—	9	—	—	14	—	—	13	—	—	14	—	—	16	—	—	13	—	—	14	—	—	15	Bristol Ph. Ins. 1827–36.
New Malton, Yks.	228	—	137	—	—	6	—	—	6	—	—	13	—	—	11	—	—	11	—	—	10	—	—	5	—	—	11	—	—	12	—	—	16	—	—	20	—	—	16	Mr. Stockton, 1823–4.
Alderley, Cheshire	177	—	188	—	—	14	—	—	15	—	—	18	—	—	14	—	—	16	—	—	14	—	—	17	—	—	17	—	—	15	—	—	17	—	—	16	—	—	15	Rev. E. Stanley.
Clifton	156	60	149	10	6	15	13	—	15	15	3	13	10	10	10	12	7	11	14	3	13	18	5	8	18	3	8	18	4	9	10	7	14	14	5	11	8	7	16	Dr. Chisholm, 1814–15.
Sidmouth	196	34	135	14	7	10	12	2	14	16	3	12	19	1	10	16	6	9	17	1	12	17	2	12	21	1	9	20	2	8	14	1	16	13	5	12	17	3	11	Dr. Clarke, 1812–14.
Penzance	119	91	155	14	—	17	13	—	15	18	—	13	20	—	10	17	—	14	20	—	10	19	—	12	18	—	13	18	—	12	16	—	15	13	—	17	13	—	18	Forbes, 1807–20.
Idem	114	87	164	15	—	16	13	—	15	18	—	13	20	—	10	18	—	13	19	—	11	18	—	13	18	—	13	16	—	14	16	—	15	13	—	17	13	—	18	Mr. E. C. Giddy, 21 yrs.
Nantes	144	115	106	12	12	7	9	11	8	10	10	11	15	8	7	12	9	10	18	7	5	20	6	5	15	7	9	15	8	7	10	10	11	4	14	12	4	15	12	Huette, 1824–5.
Pau	155	101	109	13	13	5	10	9	9	17	4	10	9	10	11	14	10	7	8	9	13	18	6	7	12	12	7	14	7	9	14	5	11	17	4	9	9	12	10	Christison, 1822–4.
Toulouse	—	—	113	—	—	10	—	—	12	—	—	11	—	—	9	—	—	13	—	—	7	—	—	8	—	—	6	—	—	9	—	—	12	—	—	12	—	—	11	
Montpelier	—	—	80	—	—	8	—	—	5	—	—	6	—	—	7	—	—	7	—	—	6	—	—	3	—	—	3	—	—	5	—	—	6	—	—	8	—	—	8	Poitevain, 1796–1806.
Marseilles	180	130	55	—	—	5	—	—	4	—	—	5	—	—	4	—	—	4	—	—	4	—	—	3	—	—	2	—	—	5	—	—	7	—	—	6	—	—	6	Thulis and Blanpain.
Genoa	—	—	—	9	5	17	15	6	7	13	9	9	15	11	4	13	11	7	16	10	4	20	9	2	15	11	5	12	10	8	9	8	14	—	—	—	—	—	—	J. Fratelli Mojon.
Camajore	166	75	123	12	7	12	12	6	10	18	10	3	13	7	10	15	7	9	16	5	9	21	4	6	21	4	7	16	5	9	12	6	13	9	7	14	10	7	14	Butori, 1777–1816.
Florence	164	98	103	19	2	10	9	8	11	12	11	10	14	4	12	13	9	9	11	4	15	26	4	1	23	6	2	12	11	8	6	13	12	10	12	8	9	12	9	Ximenian Observ. 1825.
Pisa	—	—	—	17	—	14	17	—	11	22	—	9				—	—	—	—	—	—	—	—	—	—	—	—	16	7	7	12	7	12	16	9	5	11	13	7	Piazzini, 1815–7.
Rome	197	51	117	13	5	13	14	5	9	15	6	11	15	6	9	17	5	10	18	5	7	23	3	5	23	3	5	18	4	8	15	2	14	14	4	12	13	5	13	Calandrelli, 1811–23.
Naples	210	58	97	17	3	11	17	5	6	13	8	10	17	6	8	18	7	6	17	4	9	29	1	1	16	3	12	17	5	8	17	3	11	18	6	6	15	5	11	Broschi, 1821–4.
Madeira	201	91	73	10	6	15	21	7	—	17	6	9	21	7	2	17	6	8	12	17	1	20	8	3	23	8	—	9	10	11	19	5	7	10	3	17	12	13	6	Heineken, 1826.

TABLE X.—Meteorological table for Bute, from 1821 to 1839, inclusive, deduced from registers of observations made (hourly for twelve of the nineteen years) at Rothsay cotton mills, and at Ascog, by Robert Thom, Esq.

Months.	Barometer.			Thermometer.				Direction of Wind.								Rain	State of the Weather.							
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Greatest difference	Northwest.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Inches.	Fair.	A little rain or showery.	Mostly wet.	Some snow.	Calm or moderate.	Smart breeze.	High wind.	Stormy.
January . .	30.59	28.29	29.97	49.74	20.00	38.42	24.75	3.49	3.74	3.86	4.79	1.39	6.42	4.47	2.84	2.87	17.99	7.62	3.87	1.52	25.12	3.52	2.30	0.05
February .	30.54	28.95	29.88	51.00	20.00	39.59	24.33	3.10	2.10	2.57	3.00	0.84	7.68	6.16	2.74	3.07	13.94	8.31	4.35	1.58	22.00	2.72	2.77	0.77
March . . .	30.52	29.09	29.83	54.37	28.25	41.56	24.50	3.69	3.47	2.94	2.63	1.42	7.58	5.47	3.80	3.46	17.00	7.37	5.05	1.58	25.22	2.44	2.72	0.61
April	30.43	29.14	29.88	60.42	29.75	45.80	29.16	3.10	3.94	3.94	2.84	1.31	6.47	4.70	3.70	1.97	19.58	7.26	2.79	0.37	25.76	2.65	1.41	0.23
May	30.80	29.51	30.01	69.37	35.00	52.64	33.25	4.00	4.00	5.05	3.58	.90	5.72	4.05	3.70	1.78	22.90	5.10	3.00	—	28.10	2.00	0.85	0.05
June	30.44	29.33	29.97	74.68	41.41	57.06	29.33	4.33	3.56	2.44	3.00	1.00	5.90	4.54	5.23	2.03	20.10	7.15	3.37	—	26.55	2.34	0.83	0.28
July	30.40	29.40	29.92	80.00	45.25	59.22	27.75	4.00	4.00	2.44	2.28	1.00	7.77	4.67	4.84	3.00	19.22	6.52	5.26	—	28.00	2.00	1.00	—
August . . .	30.42	29.35	29.92	80.00	41.00	57.78	30.50	5.05	3.95	2.73	2.27	.78	6.62	4.44	5.16	3.42	19.11	6.42	5.47	—	28.50	1.78	0.61	0.11
September .	30.39	29.26	29.82	69.84	36.83	53.52	27.92	3.21	4.21	2.05	2.59	1.57	8.21	5.10	3.05	3.77	16.05	7.53	6.42	—	25.29	2.24	2.29	0.18
October . .	30.79	29.09	29.88	60.05	31.58	49.18	27.50	4.37	4.16	2.00	2.31	1.00	8.10	5.96	3.10	4.32	15.47	8.06	7.42	.05	23.08	3.84	2.77	1.34
November .	30.63	28.97	29.75	54.00	27.66	43.09	25.50	4.15	4.26	2.69	3.22	1.52	5.74	4.84	3.58	4.50	13.22	8.47	8.00	0.31	23.11	2.72	3.84	0.33
December .	30.80	28.42	29.76	51.42	26.33	40.85	24.83	3.31	4.10	2.68	2.38	1.85	7.52	6.16	3.00	4.43	13.47	9.47	7.63	0.42	23.14	3.13	4.13	0.60
	30.80	28.29	29.88	80.00	20.00	48.25	60.00	45.75	45.50	35.25	35.00	14.50	83.75	60.50	44.75	38.50	208	89.00	62.50	5.50	303½	31.50	25.50	4.50

NOTES TO TABLES OF CLIMATE.

1. PENZANCE. (A.) E. C. Giddy, Esq. Average of twelve years, from 1821 to 1832 inclusive. From Dr. Forbes's Medical Topography of the Land's End, in vol. ii. of the Transactions of the Provincial Medical and Surgical Association.
(B.) Annual range, average extremes, 1821—1827. Monthly range, average extremes for twelve years, 1821—1832. Extreme range during twenty-one years, 84°—19°=65°.
(C.) Mean difference of 7 A. M., and 2 P. M.
(D.) Forbes; *Climate of Penzance.*

2. SIDMOUTH. Dr. Clarke; 1812—1814; mean of 9 A. M., and 2 P. M. *Edinburgh Medical Journal.* These observations do not give the true mean temperature, as they were not made with a register thermometer, or taken at those hours from which a close approximation to the real mean is obtained.

3. TORQUAY. Dr. Barry; January and February, 1838—Dr. Foote, from December 1829, to July 1830, inclusive, and from December 1830, to May 1831, inclusive. The winters of 1838 and of 1829–30 were severe; that of 1830–31 mild.

4. UNDERCLIFF. (A.) Col. Hewitt, Drs. Crawford, Grant, and Martin, during various years from 1829 to 1840, including the severe winter of 1829–30, and the unusually severe month of December, 1840, as also the mild winter of 1833–34.
(B.) Dr. Martin, from two years' observations.
(C.) The number of days (144) is the mean for 1839 and 1840, both of which years were unusually wet, especially 1839, when an almost unprecedented number of days proved rainy in the Undercliff, the number amounting to 177; while in 1840, also a very wet season, 111 days were rainy. It should be also remarked that under the denomination of rainy days is included those days on which ANY RAIN *fell during either day or night.*

5. HASTINGS. Dr. Harwood; from September, 1832, to March, 1834, including the mild winter of 1833–4. R. Ranking, Esq.; from June 1837, to the end of 1840, including the severe winter of 1837-38.

6. CHICHESTER. Dr. Sandon; 1794—1796. Mean of 8 A. M., and 8 P. M.; Cross of Chichester, 32 feet above the level of the sea.

7. GOSPORT. Dr. Burney; corrected for each month by Brewster's table, *ut infra.*

8. LONDON. (A.) Howard; from the observations made at the apartments of the Royal Society, Somerset House, 1797—1816; 1787—1816, 50°456. *Climate of London.* Mean of maxima and minima, 1820—1822, 49°30. Daniell, *Essay on the Climate of London.* Range of mean annual temperature during thirty years, 4°8. Howard.
(B.) Deduced from the average extremes; 1820—1823. Daniell. Maximum temperature, during thirty years, 96°; 13th July, 1808. Minimum during the same period—5°; 9th February, 1816. Howard.

(c.) Average difference of the higher and lower mean, 1797—1806. Howard. Mean daily range according to Daniell, 13°6; mean maximum, 56°1; mean minimum, 42°5.

(d.) Mean difference of the temperature of the same hours of successive days; calculated from Daniell's Meteorological Journal, 1820—1823.

8a. Environs of London, viz., Plaistow, Stratford, and Tottenham. Howard, *ut supra.*

(a.) Average extremes, 1807—1816.

(b.) Average difference of the higher and lower mean, 1807 to 1816.

9. Chiswick. Horticultural Gardens, average of ten years, 1826—1835 inclusive.

10. Bushy Heath. Colonel Beaufoy; 1824, 1825. Mean of extremes. *Annals of Philosophy.*

11. Oxford. Dr. Robertson, Radcliffe Observatory; 1816—1821; mean of maxima and minima. *Edinburgh Phil. Journal.*

12. Cheltenham. Moss; 1821, 1825, 1826; mean of extremes. Thomas's *Practical Observations, &c.*

13. Bristol. Bristol Institution; average of three years, 1834—1836, both inclusive. These tables, although made with the register thermometer, are not so perfect as could be desired, as they do not note more than twenty-seven days in any month, and in one or two months, so few as 14.

(b.) The calculations are only an approximation to the truth, as the quantities were never noted for more than twenty-six days in the month, and sometimes only twenty-three.

(c.) The number of days here given is only an approximation to the truth, as there were never more than twenty-seven days noted in any month, and sometimes so few as twenty-three. And the weather is frequently marked fine when the pluviometer indicates a fall of rain; this probably arises from the fall having taken place during the night.

14. Helston, Cornwall. Mr. Moyle; 1821—1828; 105 feet above the level of the sea.

15. Exeter. Dr. Barham. Average of eight years, 1829 to 1836 both inclusive.

16. New Malton, Yorkshire. Mr. Stockton; 1823, 1824; ninety-two feet above the level of the sea. *Annals of Philosophy.*

17. Alderley Rectory, near Knutsford, (Cheshire.) (a.) The Rev. E. Stanley; 1815, 1824, mean of 8 a. m., 2 p. m., and 10 p. m., corrected for each month by Dr. Brewster's table, as deduced from the Leith Fort Observations.

(b.) Average of extremes of ten years. Extreme range in ten years, 84°—1°=83.

(c.) Mean difference of 8 a. m. and 2 p. m. *Edinburgh Philosophical Journal,* xxiv.

18. Kendal. Dalton.

19. Bute. (a.) Robt. Thom, Esq., of Ascog. Average of nineteen years, 1821 to 1839 inclusive; the observations taken hourly for twelve years during that period!

(b.) Deduced from the data in Table X. See the following note.

Note to Table X. The maxima and minima of the barometer and thermometer in the bottom line, are the highest and lowest points reached by the mercury during the whole of the 19 years. Column 7 gives the greatest difference of temperature during

the whole of the nineteen years, for each month, and for the whole nineteen years.

The mean of the barometer and thermometer, as given in the table, is not that between the maxima and minima, but have been deduced by dividing the sum of all the degrees, noted during the whole nineteen years, by the total number of observations made during that time.

20. LEITH. (A.) Dr. Brewster; from the valuable observations made at Leith Fort, 1824, 1825.

(B.) "The measure of the daily change of temperature." Brewster. *Edinburgh Journal of Science.*

21. EDINBURGH. (A.) A. Adie, Esq.; 10 A. M., 10 P. M., 1824–1825; at Canaan Cottage, one and a half miles south of Edinburgh Castle, three miles from the sea, and 260 feet above its level. *Edinburgh Journal of Science.* Mean of year, 47°8; Winter, 38°6; Spring, 46°4; Summer, 58°2; Autumn, 48°4;—warmest month, 59°4, coldest month, 38°3. Playfair.

22. ELGIN. Observations taken at Elgin Institution, by common thermometer, during the years 1835, 1836, 1838. These observations being made at different times in the day during the various years, are of course comparatively of little value as determining the true mean temperature. 1835, 8½ A. M., 3½ P. M.; 1836, 9 A. M., 9 P. M.; 1838, 9 A. M., 3 P. M.

23. KINFAUNS CASTLE. Lord Gray: 10 A. M., 10 P. M., 5140 feet above the level of the sea; 1825, 48°319; mean of maximum and minimum 49°048. *Edin. Phil. Journ.* xxiv., xxviii.

24. COVE OF CORK. Dr. Scott. Average of three years. From 1834 to 1837. *Dublin Journal of Medical Science.* The mean monthly temperature of Cove for 1838 (of which the months of January and February were unusually severe,) contrasts advantageously with that of several other places in Britain for the same year.

25. DUBLIN. Kirwan.

26. COUNTY ANTRIM. 1814. *Edinburgh Medical Journal.*

27. JERSEY. Dr. Hooper. Average of five years. From 1831 to 1835: generally moderate winters, and including the mild winter of 1833–34.

28. ISLE OF MAN. Average of five years from 1824 to 1828, both inclusive. These observations only approximate to the true mean, having been taken by common thermometer, at 9 A. M. and 11 P. M.

29. GENEVA. (A.) Pictet. Mean of sunrise and 2 P. M.; 1080 feet above the level of the sea. Saussure, 50°74; Berne, 49°30: difference of warmest and coldest month, 36°12; Zurich, 47°8: difference of warmest and coldest month, 31°10.

(B.) Difference of the mean of sunrise and of 2 P. M. Annual range at Sion, 92°—9°=83° 1819, 92°+2°=94°.

30. PARIS. (A.) Royal Observatory; mean of extremes; M. Boward, 1806—1826.

31. NANTES. Huette, Observatory; 46 metres above the level of the sea. and 25 from the ground; 1824, 1825, 55°94. Duplessis and Bondin.

32. BOURDEAUX. Humboldt, from Guyot.

33. PAU. (A.) Mr. Christison; at Chateau Billère, from September, 1822, to July, 1824; and at Pau, Hotel de Place, from July, 1824, to May, 1825.

(B.) Mean difference of 9 A. M., and noon. Range at Toulouse, 81°—24°=57°.

(C.) Mean difference at 9 A. M., 12 A. M., and 4 P. M.

34. MONTPELIER. Poitevin; 1796—1806. *Sur le Climat de Montpelier.* 58° mean of twelve years; Mejan. Nismes, 60°26.

35. AVIGNON. (A.) M. Guerin; Musée Calvet; about seventy feet above the level of the sea; sunrise and 2 P. M.

(B.) Mean difference of sunrise and 2 P. M. Extreme range in twelve years, 101°—12°=89°.

36. MARSEILLES. (A.) Thulis and Blanpain, Royal Observatory; about 160 feet above the level of the sea; 1806—1815. *Statistique des Bouches du Rhone.* 60°10. St. Jaque de Sylvabelle. Aix 56°66; 309 feet above the level of the sea.

Range at Marseilles, 93°—20°=73°; at Aix 102°—19°=83°.

37. TOULON. M. Burel, Naval Hospital; 1749—1781. *Statistique des Bouches du Rhone.*

38. NICE. (A.) M. Risso; 1806—1825; mean of 8 A. M. and of 8 P. M., corrected by Brewster's Table. *Histoire Naturelle de l'Europe Meridionale.* Dr. Skirving, November, 1820, to February, 1826; mean of sunrise and 2 P. M. Both these series of observations nearly coincide.

(B.) Dr. Skirving; mean difference of sunrise and 2 P. M.

(C.) Idem: the mean difference of successive days at sunrise and at 2 P. M.

39. GENOA. I. Fratelli Mojon. Humboldt, 60°26.

40. LEGHORN. (A.) Dr. Peebles and others.

(B.) Mean difference, of 8 A. M. and 2 P. M.

41. NAPLES. (A.) Broschi, Observatory at Capo di Monte; 148 metres above the level of the sea; mean of sunrise and 2 P. M.; 1821—1824. Toaldo, 63°5. Palermo, 63°60. Scina, *Topografia di Palermo.*

(B.) Mean difference of sunrise and 2 P. M. Extreme range during five years 95°—26°=69.

(C.) Mean difference of successive days at sunrise and 2 P.M.

42. MALTA. Army Medico-Statistical Reports.

43. MEDITERRANEAN, General Temperature of. Mr. Wm. Black; *Edinburgh Philosophical Journal, September,* 1821. Mean of three years, affording a view of what temperature a person might be exposed to, sailing indiscriminately in different parts of the Mediterranean.

44. CORFU. Dr. John Davy. Mean of the thermometer for the years 1821—27.

45. BATHS OF LUCCA. Dr. Todd.

46. CAMAJORE. State of Lucca, at the foot of the Apennines, 105 feet above the level of the sea.

(A.) Il Canonico Butori; 1777—1816. Lucca, 60°44; forty feet above the level of the sea.

Range 88°50—24°00=64°50; extreme range in forty years 99°—18°=81°.

47. SIENNA. At Belvidera; 1786—1791; furnished by Profes. Grotanelli.

48. FLORENCE. Ximenian Observatory, Scuole Pie; 205 feet above the level of the sea; mean of three daily observations; 1824—1825. Temperature within doors 61°50, out of doors 58°75. Humboldt 61°52. Bologna 56°30. Verona 55°76. Venice 56°48. Padua 56°30.

49. PISA. Deduced from several Journals. 60°0. Piazzini.

50. ROME. (A.) Observatory of the Roman College, 163 feet above the level of the Mediterranean, and 101 feet from the level of the ground; 1811—1823. The mean of the evening observation at 9 P. M. has been preferred to the mean of 7

A. M. and 2 P. M. *Effemeride Astronomiche* 60°08. Calandrelli. 63°44. W. Humboldt.

(*) It freezes on an average about ten times in every year, and snow falls about twice a year.

(B.) Mean difference of 7 A. M. and 2 P. M. Extreme range during thirteen years 101°—22°=89°.

(C.) Mean difference of successive days at 7 A. M., 2 P. M., and at 9 P. M.

51. CADIZ. Dr. Skirving; September 1810 to August 1812, on board ship in Cadiz Bay, at noon and 6 P. M., corrected by Brewster's table; Madrid 59°0; 2040 feet above the level of the sea. Lisbon 62°. Balbi. *Essai Statistique sur le Portugal.*

52. ST. MICHAEL'S. Thomas Blunt, Esq., 1825—Mean of 8 A. M. and 8 P. M.*

53. MADEIRA. (A.) Dr. Heineken, *Funchal:* 1826. Mean deduced from mean maxima and mean minima, Gourlay; mean of extremes; 1793—1802; mean annual temperature, 66°21. Winter, 62°53; Spring, 63°00; Summer, 70°50; Autumn, 69°20; January, 61°40; February, 62°20; March, 61°30; April, 62°10; May, 65°60; June, 67°40; July, 71°10; August, 72°90; September, 72°80; October, 69°20; November, 65°60; December, 63°00. Heberden 67°30; mean annual temperature, as corrected by M. Schouw.

(B.) †Gourlay, average of eighteen years. (?) Heineken, 1826.

(C.) Mean difference of maxima and minima.

(D.) Mean difference of successive days at 10 A. M. and 10 P. M.

54. SANTA CRUZ, Isle of Teneriffe, Von Buch, from the Journal of Don Francisco Escolar; mean of sunrise and of noon.

55. CAIRO. Humboldt, from Nouet.

* See also Dr. Bullar's Observations, p. 144 of this work.

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Notes to Tables of Climate.

H659 HOCKEN,ED TREATISE ON AMAUROSIS A WALDIE 1842

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